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SUMMARY OF RECENT ABSTRACTS*

VII. HELMINTHIASIS

(*Continued from* p. 697)

NEMATODES

Hookworm Infection, Strongyloides, etc.

A focus of hookworm infection in Madrid is reported by APARICIO GARRIDO and PRIETO LORENZO (p. 767).

A high rate of infection with hookworm and other helminths was found in a rural area of Italy by BOARI (p. 1209). Sanitary conditions were primitive. The amount of illness resulting from these infections was slight. Similar findings in Italy are recorded by SOLETTA (p. 1210) in market gardeners who lived in poor sanitary conditions, but in neighbouring areas where conditions were good the people doing similar work were free from this infection. The author comments on the danger of cesspool material used as a fertilizer without treatment. Hookworm infection is common in mines in Yugoslavia (NIKOLIC and WEISER, p. 1108).

Ankylostomiasis, which was uncommon in Eritrea, is now spreading ; FERRO-LUZZI (p. 57), and also SOFIA (p. 383), have found chiefly *Necator americanus* there.

Hookworm infection is a most serious health problem in Fukien, China, where TANG (p. 384) found infection rates of 75–86 per cent. The common worm is *Ancylostoma duodenale*, and infection is particularly intense in the sweet-potato nurseries and fields, where human faeces are much used for fertilizers. Many of the patients show oedema, palpitation, dyspnoea and dizziness.

DE CARVALHO (p. 480) reports on hookworm infection in a municipality in Brazil.

SOFIA (p. 768) has studied the blood and bone marrow in the hypochromic, and usually microcytic anaemia found in hookworm disease in Eritreans. A study by BONNIN and MORETTI (p. 1108) of the bone marrow in hookworm infection supports the opinion that the anaemia is mainly the result of loss of blood. STRANSKY and QUINTOS (p. 57) argue that aplastic anaemia due to exhaustion of the bone marrow may be a result of hookworm infection ; in comment NAPIER states that the evidence produced is not very convincing.

*The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the *Tropical Diseases Bulletin*, 1950, v. 47. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.

A study of the cardiovascular system in Eritreans suffering from hookworm infection and anaemia is reported by LANZO (p. 767). Details should be sought in the original.

The Costa reaction is not specific for helminthiasis, but VACCARO (p. 639), who describes the technique, thinks that it has a value in diagnosis and in estimating the results of treatment, in hookworm and *Ascaris* infection. He (p. 865) describes a test with phenol phthalein which, he claims, indicates when all hookworms have been eliminated by treatment. Its rationale is that with an intact intestinal mucosa, a small amount of the chemical administered by mouth cannot be detected in the urine.

In 15 of 20 patients with hookworm infection ANDRINI and CASTRIOTA (p. 768) found evidence of reduction of complement in the serum.

LIE KIAN JOE and BRAS (p. 861) have found one female *A. caninum* in the bowel contents of an Indonesian woman.

GALLIARD (p. 145) discusses the infective power and virulence of strains of *Strongyloides*. Adult *S. stercoralis* are embedded deeply in the duodenal mucosa, and the larvae force a path through the tissues to reach the lumen. GALLIARD and BRUMPT (p. 58) quote two cases in which symptoms of duodenal ulcer were associated with this infestation, and they discuss the general symptomatology of the condition. Treatment is disappointing. CORRIGAN (p. 59) reports a case in which pulmonary infiltration, pleural effusion and asthmatic attacks were associated with infestation with *Strongyloides*. No larvae were found in sputum.

In the treatment of *Strongyloides* infection PALMER (p. 640) has used gentian violet injected intravenously each day for 20 days, with success ; 41 of 45 patients were cured by one course, the remainder by a second. TORRES (p. 556) found that Hetrazan had no value.

STEWART (p. 385) reports extensive infection of labourers employed by the Anglo-Iranian Oil Company in South Persia, with various worms. Certain eggs which were commonly seen in faeces were diagnosed as those of *Trichostrongylus*.

Ascaris, etc.

Ascaris infection is very prevalent in parts of rural Germany, where it is associated with the use of human faeces in vegetable gardens (LENTZE, pp. 479, 865 ; BURLINGAME, p. 867 ; SCHLIEPER and KALIES, p. 868 ; MENDHEIM and SCHEID, p. 1002). In the Griesheim area the infection rate was as high as 84 per cent. in children and 100 per cent. in adults (BURLINGAME, p. 867). Control is a matter of proper disposal of faeces, the cessation of use of sewage effluent for irrigation of vegetable plots, and promotion of general cleanliness. STUTZ (p. 1018) shows that a process of drying used for the sewage of Mannheim is effective in killing the eggs of *Ascaris*.

BURLINGAME (p. 866) describes a method for the enumeration of *Ascaris* eggs, details of which are given in the original abstract. For examination of waste waters, which are not likely to contain many helminth eggs, the method of filtration through ordinary filter paper and examination of the paper microscopically is very satisfactory. HÖTZ and BROSCHEIT (p. 1018) have used the method quantitatively.

Immunological studies on human and porcine strains of *A. lumbricoides* suggest that there is no difference between them (KOZAR, p. 258).

SPRENT (pp. 145, 1108) has studied the toxic and allergic effects of injections of fractions of extracts of *Ascaris* on worm-free, infected and sensitized guineapigs, and SCHMIDT (p. 870) has experimented with an antigen of various fractions.

The lesions in acute intoxication by the toxic products of *Ascaris* are oedematous and haemorrhagic ; death from pulmonary oedema is the rule in guineapigs (DESCHIENS *et al.*, p. 481).

After investigating the rôle of bacteria in the appearance of haemolytic properties in extracts of *Ascaris*, MASQUELIER and BAILENGER (p. 480) think that they probably liberate a specific haemolytic substance from the worms.

ROSSI-ESPAGNET (p. 641) has prepared an extract of muscle of horse *Ascaris*, which produces reactions in people infected with *A. lumbricoides*.

MÜLLER (p. 641) remarks that although *Ascaris* infection is most common in children, severe eosinophile infiltration of the lungs is seldom seen in them ; it is more common in adults. The protective pulmonary reaction takes months to develop, and *Ascaris* causes allergic phenomena only in its larval phase. MERCER *et al.* (p. 1109) discuss the relationship between *Ascaris* infection and chronic eosinophilia with visceral manifestations.

DE OLIVEIRA (p. 258) shows that certain symptoms in pregnant women, such as mild albuminuria, anaemia, etc., may be attributed to the pregnancy, but can be removed by treatment with resorcinol which eradicates *Ascaris* and hookworms. These are probably the cause of the symptoms. From Germany, BREUER (p. 481) reports a case of heavy *Ascaris* infection in a child who was very ill with albuminuria and anaemia ; these slowly improved after 200 worms had been expelled.

In a discussion of *Ascaris* infection of the biliary tract, CAMPO POSADA (p. 386) puts forward the view that the worms may reach the biliary passages from the blood stream, while in the larval stage. A fatal case of *Ascaris* infection, with intestinal obstruction and peritonitis, is described by JACOBSEN (p. 870). NAVARRANNE (p. 642) discusses the troubles liable to occur after abdominal operations on patients who harbour *Ascaris ;* they include colic, peritonitis and fistula.

COLBOURNE (p. 768) used Hetrazan for *Ascaris* infection, but in the doses given it was less successful than chenopodium. JOCHIMS and WREDE (p. 258) report that treatment of 4 children who had *Ascaris* infection, with normal doses of Bedermin (which contains ascaridol and carbon tetrachloride), was fatal to two of them. It was found that the carbon tetrachloride in the capsules was 10–15 years old, but the actual cause of death was not determined. ZSCHUCKE (p. 1018) remarks on the risk of using Bedermin. It should never be used after prolonged storage.

LIE KIAN JOE (p. 390) describes a case of gnathostomiasis in Indonesia.

Filarial infections

General.—MONTEIRO (p. 147) has devised a method of vital staining which facilitates the recognition of microfilariae.

RODHAIN (p. 61) has contributed a long discussion of the rôle of microfilariae in the pathogenesis of filariasis due to *Wuchereria, Onchocerca, Loa* and *Dirofilaria*. The original abstract should be consulted.

Wuchereria bancrofti.—POINDEXTER (p. 1211) shows that there is a high incidence of *W. bancrofti* infection in Liberia. He makes the point that repeated infection is important in the development of clinical symptoms. Extensive studies have been made of the microfilaria counts at all hours of the day and night. BELLEFONTAINE (p. 259) discovered a high incidence of *W. bancrofti* and *O. volvulus* in a district of the Belgian Congo. PEEL and VAN OYE (p. 1111) failed to find evidence of congenital filariasis in children of infected mothers in the Belgian Congo, although microfilariae of various species were found in many of the placentas.

Filariasis is rare in Cuba, but PÉREZ ARA (p. 1213) reports a case of involvement of the epididymis.

PESSÔA and ANDRADE (p. 1111) estimate the prevalence of *W. bancrofti* infection in Salvador, Bahia, at 4·6 per cent. DEANE (p. 1212) found infection with both *W. bancrofti* and *M. ozzardi* in the people of Manáus, Brazil; the latter was mostly contracted outside the town. By examining blood between 7.30 and 9 p.m., and again between 11.30 p.m. and 3 a.m., in larger quantity, DEANE (p. 1212) has shown that for *W. bancrofti* the proportions found positive (in 968 persons studied) were 12·3 and 14·3 per cent. respectively. The difference does not warrant the inconvenience associated with the later hour.

HUNTER and WARREN (p. 1112) showed [once more] that nocturnal periodicity in *W. bancrofti* infection could be altered by changing the sleeping hours.

In the South Pacific area SCHLOSSER (p. 386) has found full development of *W. bancrofti* in *Anopheles farauti*. He thinks that *A. punctulatus* may also be a vector. In the Treasury Islands (Solomons group) PERRY (p. 497) found *W. bancrofti* in 0·7 per cent. of people in one village; *Anopheles farauti* showed the highest incidence of developing larvae.

An account of filariasis in Tahiti is given by GALLIARD *et al.* (pp. 60, 146). The form is non-periodic, and the vector *Aëdes scutellaris pseudoscutellaris*. About one-quarter of the people in one area showed microfilariae, and 9 per cent. had elephantiasis. This is a detailed account which should be read in full. In the Cook Islands the vector of *W. bancrofti* is *Aëdes pseudoscutellaris*, which breeds in tree holes and small collections of water. DAVIS (p. 64) shows that an effective system of control was established by a careful system of measures taken against breeding and resting places. By these means the mosquitoes were greatly reduced even without the use of modern insecticides.

Hetrazan has been used by many workers for the treatment of infection with *W. bancrofti*, usually with good results (RAMAN *et al.*, p. 643; CANET and JAHAN, p. 261; BRICEÑO ROSSI and HEWITT, p. 387). Some of the dosage schedules are as follows:—0·9 to 2 mgm. per kgm. three times daily for 10–23 days; good results (HALAWANI *et al.*, p. 64); 2 mgm. per kgm. three times daily for up to 21 days; good results in boys (MALDONADO *et al.*, p. 872); 2 mgm. per kgm. three times daily for 10–25 days; good results (BRICEÑO ROSSI, p. 769); total doses of 13 to 193 mgm. per kgm.; good results indicating permanent effect in abolishing the microfilariae in the blood (HEWITT *et al.*, p. 871).

In 1948 Hetrazan was issued to all the inhabitants of the island of St. Croix, with relevant instructions. Examinations at intervals since then have shown reduction in the proportion of people carrying microfilariae of *W. bancrofti*, and greater reductions in parasite counts. HEWITT *et al.* (pp. 387, 1021) consider that the use of Hetrazan provides the most practical method for reducing the reservoir of infection. In most of a group of persons in Brazil, who had *W. bancrofti* in their blood, treatment with 1 mgm. Hetrazan per kgm. for 3 days reduced the number of embryos to 2–3 per 20 cmm. blood, which is regarded as a level at which the patient is not infective (DEANE and DA COSTA, p. 769). In three cases of chyluria treated with Hetrazan, the urine became clear (MAUZÉ and LANGUILLON, p. 1112).

LUBRAN (pp. 388, 1020) has used the general method of Brodie and Udenfriend for the estimation of Hetrazan in biological fluids.

In a series of studies on the chemotherapy of filariasis, OTTO and MAREN (p. 1115) have examined the pharmacological action of arsenamide and related compounds, the excretion and concentration of antimony in the blood and tissues after injection of trivalent and pentavalent antimonials, and have compiled a review of the agents which might be useful in canine or human filariasis.

DEJOU (p. 260) believes that in the early stages of elephantiasis of the scrotum, treatment with sulphonamides may improve the condition, facilitate surgical operation and prevent relapse.

W. malayi.—RAGHAVAN and KRISHNAN (p. 1110) show that *W. malayi* infection is present in an island in the Madras Presidency, where *Mansonioides annulifera* is the probable vector. SOMASUNDARAM (p. 60) reports a filarial survey of a town in Madras, where both *Mansonioides* and *Culex fatigans* were found infected. RAGHAVAN and KRISHNAN (p. 1021) failed to infect *C. fatigans* and *Anopheles stephensi* with *W. malayi.*

KOUWENAAR (p. 63) describes a syndrome of eosinophilia and adenitis with abscess in which there are larvae of *W. malayi.* Microfilariae are not usually found in the blood, and other signs of filariasis are not seen. The condition is not uncommon in Indonesia.

In 20 patients in Malaya with microfilariae of *W. malayi* in the blood but without symptoms, Hetrazan in doses of 0·28 to 2·15 mgm. per kgm. thrice daily produced fever, headache and nausea, but WILSON (p. 1213) notes that when this reaction had subsided the dose could be quadrupled without ill-effect. With these doses given for 21 days the microfilariae were reduced or disappeared ; with 0·12 mgm. per kgm. there was no reaction, but the microfilariae were not affected. In patients with symptoms of filariasis but no microfilariae in the blood the effects of Hetrazan were not immediately good though there was evidence of some late improvement. On the whole, Hetrazan produced severe reactions in these Malayan cases, which may be due to the species of worm (*W. malayi*) involved.

Onchocerca.—In a district of Uganda near Jinja, WILKINSON (p. 388) found evidence of onchocerciasis in 13 of 17 Africans by allowing *Simulium damnosum* to feed on them, and then examining the blood they had taken. Several flies fed on each person. BARNLEY (p. 645) describes a newly discovered focus of onchocerciasis in the Kigezi district of Uganda, at a height of over 5,000 feet. Infection rates varied from 30 per cent. at age 10–15 to 78 per cent. at age 35–40. A very few *Simulium neavei* were caught.

In a district of the Upper Volta PUYUELO (p. 484) found evidence of onchocerciasis in 20 per cent. of the people, but thinks that a systematic search would have shown it in 60–80 per cent. Blindness was present in 7·6 per cent. in one village. He treated patients surgically, and some with Hetrazan, and points out that Hetrazan may cause allergic reactions. In the Léopoldville area the infection rate with *O. volvulus* rises to 60 per cent. at age 9–15, and 16·2 per cent. of *Simulium damnosum* harbour larvae. WANSON *et al.* (p. 647) show that these flies breed largely in association with various aquatic plants in the Congo river, especially the bamboo-like *Pennisetum nodoflorum.* The flies are sensitive to DDT and BHC, but it is not possible to use these as an emulsion in the river, to attack the larvae, because such large quantities would be needed. They found that adult flies congregated on vegetation along the banks of the river, and they have therefore used DDT as a cloud from aircraft, applied daily for 26 days. The residual effect persists for only 48 hours, but the result of this treatment has been virtual elimination of *Simulium.*

NETTEL (p. 646) records the number of adult *Simulium* captured in part of Mexico.

VARGAS and RUIZ REYES (p. 557) have found *O. volvulus* in *Simulium exiguum.*

For the first time infection with *O. volvulus* has been observed in man in Venezuela (VOGELSANG and POTENZA, p. 770). POTENZA *et al.* (p. 770) state that the vector is *Simulium metallicum*, but that *S. ochraceum* is also present.

LUIS GONZÁLEZ *et al.* (p. 645) found in eastern Venezuela infection rates of 4·1 per cent. in childhood to 51·5 at ages over 40. They captured several species of *Simulium* in this area.

A satisfactory method for puncturing the pinched-up skin to obtain microfilariae of *O. volvulus* has been devised by NETTEL (p. 646).

During operations for various conditions BECKER (p. 646) has found adult female *O. volvulus* free in the tissues of three patients in the Belgian Congo. The worms were alive, but there was no neighbouring inflammatory reaction.

MAZZOTTI and OSORIO (p. 771) have found embryos of *O. volvulus* in the blood and urine of patients. This is important because previously, where microfilariae have been found in blood or urine, *W. bancrofti* has been endemic, and it has been assumed that the larvae were of that species, even if *O. volvulus* were present in the area.

PUIG SOLANES (p. 483) found lesions of various kinds in many of the eyes of 15 patients with onchocerciasis ; he examined the angles of the anterior chamber of the eyes and found this procedure useful in elucidating the pathogeny of the changes.

BRUMPT and CHABAUD (p. 148) advance the theory that the predilection of microfilariae of *O. volvulus* for the tissues of the eye is part of a general phototropism which leads to the formation of nodules in those parts of the skin which are exposed to light.

A favourable effect of Hetrazan in onchocerciasis is reported by RUIZ REYES (p. 1117) and MARTÍNEZ BÁEZ (p. 149) in Mexico. They refer to reactions such as pruritus, oedema and fever, probably the result of disintegration of the microfilariae caused by the drug, but these are not usually serious. MAZZOTTI (p. 68) points out that if there are many microfilariae, the allergic reaction is likely to be strong.

By examining onchocercal nodules from patients treated with Suramin, Hetrazan or Arsenamide, ASHBURN *et al.* (p. 389) conclude that Suramin has a definite lethal effect on the adult worms, which is greater than that of Hetrazan. In comment HAWKING remarks that the dose of Hetrazan used in these trials was low.

Loa loa, etc.—In a long paper GORDON *et al.* (p. 1214) give much information on infection with *L. loa* and its transmission in West Africa. The genus *Chrysops* is found all over the world, but the subgenus *Kleineana*, which contains all the known vectors of *L. loa*, is restricted to Africa, chiefly the rain forest region. Larvae are found in densely shaded streams whose flow is impeded by vegetation. The female fly bites in the daytime, about once in 14 days, and the worm takes about 12 days to develop in the fly, without doing it much harm. The fly hunts probably by sight, and prefers well lighted houses of Europeans to the dark houses of Africans. The male fly does not feed on blood. Larvae of the worm penetrate the skin, and the next stage, which is not known in any detail, takes 6–18 months. The authors discuss clinical symptoms of the infection, and remark that treatment with Hetrazan is successful. Flies can be repelled by dimethyl phthalate, but control is at present impracticable.

A general account of *L. loa* infection is given by STEFANOPOULO (p. 1024), who refers to the good effect of Hetrazan. There have been few records suggesting cerebral localization of lesions in filariasis, but BERTRAND-FONTAINE *et al.* (p. 67) report a case in which *L. loa* was apparently responsible for paresis, which was considerably improved after treatment with the compound 3799 R.P. (Hetrazan).

Good results in the treatment of *L. loa* infections with Hetrazan are reported by MURGATROYD and WOODRUFF (p. 262), who gave doses of 2 mgm. per kgm. three times daily for 10–21 days ; by TASQUÉ (p. 483), VANBREUSEGHEM (p. 873) in *gale filarienne*, WANSON *et al.* (p. 873), SCHNEIDER (p. 1114), HECKENROTH *et al.* (p. 1114), and BONNIN and MORETTI (p. 1115). Several of

these authors refer to reactions in the course of this treatment, some of which were severe. These may be relieved by antihistamine drugs.

HENRARD and PEEL (p. 66) do not think that *A. perstans* is transmitted by species of *Culicoides*, and they review critically the work of Dyce SHARP in this sense. They think that *Tunga penetrans* can perform this function, but proof that it does so is not complete. WANSON and PEEL (p. 65) show that no larvae of *A. perstans* have been found in routine examinations of many thousands of mosquitoes in the Belgian Congo, though partial development can take place experimentally, under certain conditions.

An account of the distribution of microfilariae in the Coquilhatville region is given by CHARDOME and PEEL (p. 65), who show that *Dipetalonema streptocerca* develops to maturity in *Culicoides grahami*, and that both *C. grahami* and *C. austeni* pick out this microfilaria, but not the microfilaria of *A. perstans*, when they feed on a patient with both infections. It is evident that *Culicoides* species are the vectors of *D. streptocerca*, and do not transmit *A. perstans*.

GERMAIN *et al.* (p. 1113) report that Hetrazan seems to have cured a case of infection with *A. perstans*, and another with *L. loa*, but HECKENROTH *et al.* (p. 1114) report that it had no effect on larvae of *A. perstans* in one case, and WANSON *et al.* (p. 873) found that it failed to eliminate them in several patients.

In blood films from patients with *L. loa* or *A. perstans* infection, MAIER (p. 644) noticed localized collections of eosinophiles in the neighbourhood of the microfilariae. He discusses the possible mechanism of this phenomenon.

WANSON *et al.* (p. 873) show that Hetrazan successfully eliminates microfilariae of *Dipetalonema streptocerca* from the skin.

High rates of infection with *Mansonella ozzardi* are reported by SAUTET (p. 556) from a leprosarium and village on the island of Désirade. BRICEÑO ROSSI and MAYER (p. 644) report *Mansonella ozzardi* in Indians of South Venezuela, for the first time.

ROMAÑA and WYGODZINSKY (p. 1112) have found a high rate of successful experimental infection of *Culicoides* with *Mansonella ozzardi*. They think that these flies are probably the natural vectors in Northern Argentina.

MONTESTRUC *et al.* (p. 1113) report that Hetrazan acted on the microfilariae of *M. ozzardi* in two patients.

Dracunculus.—LINDBERG (p. 1118) writes of the Cyclopidae which act as hosts of *Dracunculus* in the Middle East. ONABAMIRO (p. 390) has found that when *Cyclops* are chilled at 7·5 to 10°C. they are immobilized, but any contained larvae of *Dracunculus* remain active. By this procedure large numbers can be examined quickly.

Penicillin has been used successfully for secondary infection in guinea worm infection, but BHANDARI (p. 649) quotes cases in which daily local injections apparently acted on the worm itself, with good results.

Litomosoides.—*Litomosoides carinii* is much used in experimental work on filariasis. BERTRAM (pp. 482, 874) has devised a method for infecting *Liponyssus bacoti* with *L. carinii*, by which he has obtained an infection rate of 56 per cent., and he has found that the number of worms which establish themselves in the mite may be much below the number counted in the venous blood of the rat host. It seems that the mite takes up blood without swallowing the corresponding number of larvae. The papers should be read in full. KERSHAW (p. 557) shows that larvae of *L. carinii* appear in the blood 50–60 days after infection. He records observations on the larval count after this period. STEFANOPOULO and OVAZZA (p. 390) have established a strain of *L. carinii* in the cotton rat and have transmitted it by using artificial rat nests containing *Liponyssus bacoti*.

After treatment with Hetrazan of cotton rats infected with *L. carinii*, HAWKING *et al.* (p. 1019) noted a considerable reduction of microfilariae in the blood, and an increase in the numbers in the liver. Phagocytosis of the microfilariae in the liver became marked, and the authors argue that Hetrazan has an opsonin-like action. Parasites were also destroyed in the spleen and bone marrow, but to a lesser extent.

SEWELL and HAWKING (p. 1023) tested 220 compounds for activity against *L. carinii*. No significant activity was found in any which had not already been tested by other workers. PETERS *et al.* (p. 147) have experimented with cyanine dyes in relation to filariasis ; one compound gave promising results in treatment of cotton rats infected with *Litomosoides carinii*, but is ineffective against *W. bancrofti* in man.

Enterobius : Trichuris : Trichinella

MCMULLEN (p. 262) has made detailed observations on a man with *Enterobius* infection during the time he was with his infected family, after he left them, and until the infection finally disappeared. He discusses the frequency and rhythm of the descent of female worms. HITCHCOCK (p. 391) makes the points that *Enterobius* infection is commoner in children of families of 2–4 children than in families of 1 child, and that there is no difference in the rates in children from families of different income groups. APARICIO GARRIDO (p. 149) emphasizes the fact that enterobiasis is a family infection and that treatment should be given to all carriers, whether they have symptoms or not. Gentian violet gives the best results.

Enterobius infection has been studied in Germany, where, in post mortem studies, LEICK (p. 485) found a high incidence in children and townspeople. MENDHEIM and SCHEID (p. 68) in Munich, and BECKERS (p. 486) in Bonn found high incidence in children. PAPAYANNIS (p. 70) found *Enterobius* in 61 per cent. of a group of people suffering from pruritus ani.

Ascaris, *Trichuris* and *Enterobius* infections are fairly common in certain children's homes in Lisbon (DE AZEVEDO *et al.*, p. 1003). *Enterobius* infection was found by MARTELLI and ZAFFINO (p. 1118) in 71 per cent. of children in four child colonies in Rome. In Czechoslovakia JÍROVEC (p. 771) found that the incidence of *Enterobius* infection was higher in rural school children than in children in Prague. The most effective protective measures depend on cleanliness. The author does not advocate chemotherapy for slight infections.

In Gdańsk, KOZAR (p. 69) found *Enterobius* in 72·9 per cent. of 850 school children. He thinks that individual treatment would be useless because reinfection would inevitably occur. Mass treatment is essential.

An infestation rate with *Enterobius* of about 12 per cent. was found by HEILMANN (p. 649) in a Veterans' hospital in the United States.

Enterobius was found in 12 per cent. of appendices taken at autopsy, and 33·6 per cent. at operation, by QUINTANAR and OSORIO (p. 263) in Mexico City.

SCHÜFFNER (p. 649) describes once more the process ef retrofection by *Enterobius*, in which eggs hatch on the perineum and the larvae migrate back through the anus into the colon, where they develop. In light infections it can be observed that eggs are found on the perineum for a few days only, and there is then a latent period when no eggs can be detected, followed again by their presence for a short time. In heavy infections this process is overshadowed by finger contamination. SCHÜFFNER and SWELLENGREBEL (p. 876) describe the experiments by which they proved that larvae of *Enterobius*, deposited at the anus may enter the bowel and develop there. SCHÜFFNER (p. 70) shows that eggs of *Enterobius* remain viable for 3 weeks when dry, in dust.

MARKEY (p. 876) has devised a swab coated with paraffin wax, for use in the diagnosis of *Enterobius* infection. MENESES RUBIÁNEZ and AVENDAÑO ESCALANTE (p. 1216) have compared the method of Graham with that of Hall, for the diagnosis of *Enterobius* infection, and find the former much the more effective. BEAVER (p. 69) also prefers a modification of the Graham method.

DENHOFF and LAUFER (p. 150) have studied the symptoms commonly attributed to enterobiasis, but found them no more common in infested children than in controls, and showed that they were not influenced by anthelmintic treatment. A case of sub-ileus, apparently due to heavy *Enterobius* infection, is reported by STRAUSS (p. 651).

EUCKER (p. 557) discusses the treatment of *Enterobius* infection with preparations of phenothiazine, with which he has had moderate success. Details of administration should be sought in the original. WARNECKE (p. 877) did not obtain good results in the treatment of *Enterobius* infection with gentian violet. STURSBERG (p. 263) gives oil of chenopodium as an enema after a preliminary wash out, for *Enterobius* infection. Results are very good.

KUITUNEN-EKBAUM and JAMES (p. 877) tried Diphenan in *Enterobius* infection. It is not toxic, but in the doses given it was not very successful. It is, however, easy to give, and may be useful in small children. EICHHOLTZ *et al.* (p. 1025) have experimented with the drug known as Egressin in the treatment of *Enterobius* infection. It is not toxic in the doses used, and is useful in eradicating the infection. Its composition and properties are described.

WEISE (p. 1203) writes of the value of the papain preparation known as Vermizyme, which has a value in *Enterobius* and *Ascaris* infections.

With the possible use of benzene hexachloride as an anthelmintic in mind, GRAEVE and HERRNRING (p. 391) have conducted tests on animals which indicate that its toxicity is low. It has a lethal action on ascarid worms *in vitro*, and the authors propose to try it in *Enterobius* infection in man. BREDE (p. 392) has used a preparation which contains 70–80 per cent. BHC, for the treatment of *Enterobius* infection in 148 patients. Very good results were obtained with tablets given every day for 3 days, followed by an interval of 3 days, this course being repeated to cover a period of 21 days, during which 24 tablets (each containing 25 mgm. of 70–80 per cent. Gammexane) were taken. SCHNEIDER (p. 486) has studied the action of BHC on various worms ; it acts on the ganglia and on the muscle. He has used it by the mouth and as suppositories, in the treatment of *Enterobius* infection.

HARANT and CARON (p. 391) have used garlic in suppositories for the treatment of *Enterobius* infection.

BOEHNCKE (p. 875) does not think that *Trichuris* is harmless, but that its effects probably vary, from harmlessness to the ability to cause death. It may give rise to colic and symptoms resembling appendicitis or tuberculosis, and eosinophilia. An arsenical preparation, Spirocid, is useful in treatment. HUANG (p. 1118) writes of a case of intussusception which he attributes to *Trichuris* infection.

HOEKENGA and BOX (p. 390) have used *leche de higuerón* for the treatment of infection with *Trichuris*, and report some success, but with minor gastro-intestinal symptoms.

WAGNER (p. 878) discusses trichiniasis in man and animals, on general lines.

BROWN *et al.* (p. 558) quote evidence to show that trichiniasis is common in Eskimos in part of Canada.

COVEY *et al.* (p. 71) describe two fatal cases of trichiniasis in one of which there was major arterial thrombosis ; the patients were man and wife.

GAASE (p. 879) describes work, already done and reported, on the immunological diagnosis of trichiniasis in man and animals.

SOUTHAM *et al.* (p. 392) note that false positive *Trichinella* precipitin tests are found in certain neoplastic diseases.

HENDRICKS (p. 651) shows that in mice which received successive doses of *Trichinella* larvae at intervals of 21 days there was a progressive diminution in the percentage recovered from the small intestine, and a progressive increase in the precipitin titre of their sera. GAASE (p. 559) shows that a *Trichinella* antigen injected into guineapigs offers some protection against subsequent infection. Additional evidence of immunity is the lack of symptoms in man in areas where trichiniasis is endemic. *Charles Wilcocks*

MALARIA

ROMEO VIAMONTE, J. M. Los anofelinos de España y de la zona española del Protectorado de Marruecos. Su relación con la difusión del paludismo. [**The Anophelines of Spain and Spanish Morocco, in relation to the Distribution of Malaria.**] *Rev. Sanidad e Hig. Pública.* Madrid. 1950, Apr., v. 24, No. 4, 213–95, 32 figs. [26 (12 coloured) on 17 pls.] [117 refs.]

The author presents a very full and clearly set out account of the species of *Anopheles* which occur in Spain, the Canary Islands, the Balearic Islands and the Spanish Zone in Morocco. The monograph also contains some information on the relation between these insects and malaria.

A considerable amount of information has been published about the Spanish Anophelines, most of it fragmentary or relating only to a part of the country. The author has referred to a large number of publications and we judge that his collection is complete. The earliest reference to *Anopheles* mosquitoes in Spain was a paper by a Dr. MACDONALD, physician to a mining company in the Sierra Morena : his notes were published so long ago as 1900. In the years that have passed the best-known investigators have been GIL COLLADO, PITTALUGA and SADI de BUEN. The author himself has had a considerable amount of experience in the field, not only in Spain, but also in the Canary Islands ; doubtless his first-hand knowledge has helped him to present this excellent account of the whole subject.

For Spain, the author accepts the existence of nine species of *Anopheles* and in addition four races of *A. maculipennis*. Among the species one observes *A. claviger*, *plumbeus*, *hispaniola*, *sergenti* and *multicolor*, a curious list with a northern and southern element in it. The last, the identification of which appears to have been well-established, is a recent addition to the Spanish list, and is not known to occur in any other part of Europe. The author, rightly we think, rejects the earlier records of *A. superpictus*. In addition, no less than four races of *A. maculipennis* have been identified. From the Balearic Islands, he records *A. maculipennis* of a race which has not been determined, and *claviger*. In Teneriffe and Grand Canary, *hispaniola* and *sergenti* occur. From Spanish Morocco, there are records of *claviger*, *maculipennis labranchiae*, *hispaniola* and *multicolor* ; *A. sergenti* is not recorded but can hardly be absent, occurring as it does in Southern Morocco, Algeria, Spain and the Canary Islands.

The distribution of all species and races within the area covered by the monograph is shown on a series of maps. There are also half-tone reproductions of drawings, giving points of distinction between species which are rather similar : the distinctions between *A. multicolor* and *hispaniola* are clearly shown. The coloured plates of adult mosquitoes add very little to the value of the book. In addition, there are long lists giving the localities where different

species have been captured : the distribution of the species under Provinces is also recorded.

The relation of species of *Anopheles* to malaria is not clear. A considerable number of dissections were carried out at a period when it was only possible to record *A. maculipennis* without distinguishing the races. These dissections show little except that the rate of infection with *Plasmodium* was extremely low, and the number of positive findings in salivary glands was so small that one can place little reliance upon it. The author must, therefore, rely on epidemiological observations in his own and other countries. In Spain, he regards *A. m. labranchiae* as an important vector, within its very limited area of distribution on the south-east coast. Most cases of malaria are probably to be attributed to *A. m. atroparvus*, which has a wide distribution throughout the country. For the Canary Islands, where only two species occur, *sergenti* and *hispaniola*, he does not appear to think that one is more important than the other. On the interesting general question of the importance of *A. hispaniola* in Spain or the Canary Islands little information is at present available.

P. A. Buxton

BORDAS, E. & DOWNS, W. G. **Control of *Anopheles pseudopunctipennis* in Mexico with DDT Residual Sprays applied in Buildings. Part IV. Activity Pattern of Adult *A. pseudopunctipennis* Theo.** *Amer. J. Hyg.* 1951, Mar., v. 53, No. 2, 217–23, 3 figs. [20 refs.]

Anopheles pseudopunctipennis is the only malaria vector in the rice-growing district in Morelos in Mexico. It is a hardy species with a long flight range. It feeds readily on the blood of man and animals, but prefers animals. It breeds all the year round in stream pools and adult density builds up from May (before the wet season) on to October.

Observations were made on the movements of this mosquito in specially constructed houses in the rice fields. It was found that the females feed mostly out-of-doors at night, though some will feed inside. Both sexes enter houses at dawn for shelter, though some females, having fed early, will not wait until morning but will enter during the night. The anophelines, once inside, will rest all day. Females which have fed remain indoors until their blood meals are digested and their eggs matured. Then at dusk, the males leave, soon followed by the unfed females and those with developed ovaries. This pattern of mosquito behaviour explains the success of DDT residual spraying campaigns in those areas of Mexico where *A. pseudopunctipennis* is the principal malaria vector.

H. S. Leeson

NAVARRO, R. J. & SANTIAGO, N. **Splenomegaly in Malaria.** *J. Philippine Med. Ass.* 1950, Feb., v. 26, No. 2, 61–4.

The authors in the Philippines remark that there is a prevailing idea that malaria produces enormous enlargement of the spleen, especially in chronic infections. This belief is so strong that, whenever a patient is found to have a greatly enlarged spleen, malaria is at once thought of, and standard textbooks give the same impression. Over 400 cases, all of which showed malaria parasites in the peripheral blood or spleen punctures or both were studied during the three years of the Japanese occupation of the Philippines and, although records were lost, it is recalled that none of the above showed a spleen enlarged below the umbilicus.

More recently a series of 140 cases was studied, all of which showed parasites in the peripheral blood or spleen in different stages of development. No attempt was made to identify the species of parasite.

Two tables are given, one showing the degree of splenic enlargement, the other the duration of the illness. No attempt is made to correlate the statistics in the two tables. Seventy-three cases (more than 50 per cent.) did not show a palpable spleen, only 11 showed a spleen palpable 3 to 5 cm. below the costal margin while none showed this organ to be palpable below the umbilicus. It is pointed out that two diseases may occur in the same patient, for example, haemolytic jaundice and malaria. *C. F. Shelton*

SICÉ, A. & BINDER, T. Contribution à l'étude du paludisme congénital. [**A Note on Congenital Malaria.**] *Acta Tropica.* Basle. 1951, v. 8, No. 1, 32–5.

A multiparous Peruvian woman, aged 30, gave birth to a normal female infant. The confinement was prolonged and the placenta had to be removed by artificial means. The mother gave no history of malaria, but on the day after delivery her temperature rose to 39°C. and both schizonts and gametocytes of *P. falciparum* were found in the peripheral blood. The infant became ill on the third day after birth and 24 hours later schizonts and gametocytes of *P. falciparum* were found in her blood also. Both mother and child responded well to treatment with proguanil, the temperature falling to normal in each case after 48 hours. The authors consider that the presence of chronic malarial infection was probably one of the causes of the prolonged confinement and that the febrile attack was brought on by the fatigues of labour. They point out that with the antimalarial remedies now available it should be possible to ensure normal pregnancy and prevent the occurrence of congenital malaria by regular drug prophylaxis of the mother. *G. Covell*

CODA, D. Tratamento da malária pela Nivaquine em dose única. 1a Contribuição. [**Treatment of Malaria with a Single Dose of Nivaquine.**] *Arquivos de Hig. e Saúde Pública.* S. Paulo. 1950, Mar., v. 15, No. 43, 15–16.

The English summary appended to the paper is as follows :—

" The author has treated 15 patients infected with malaria by the *P. vivax* with the preparation Nivaquine administered by mouth, in a single dose and in only a day ; the doses employed have varied according to the patients ages : from 0 to 1 year old : 0·15 g.—from 2 to 8 years old : 0·30 g.—from 9 to 12 years old : 0·45 g.—more than 12 years old : 0·60 g. The author regrets not to have observed cases of malaria by the *P. falciparum.* The use of the drug did not bring any toxic effects, and the disappearance of the schizonts and gametes occurred on the same occasion and the effect on the fever was prompt. Three months after treatment he did not observe any case of relapse."

CODA, D. Tratamento da malária pelo Camoquin em dose única. [**Treatment of Malaria with a Single Dose of Camoquin.**] *Arquivos de Hig. e Saúde Pública.* S. Paulo. 1950, Mar., v. 15, No. 43, 17–22.

The English summary appended to the paper is as follows :—

" The author makes a short pharmacological summary of the Camoquin, and passes in review the literature within his knowledge ; he presents a scheme of treatment by means of the drug, in a single dose, used at the Public Service of Malaria.

" During 15 months he has treated 178 patients, and observed no toxic effects in his patients, whose ages varied from 45 days to 66 years old.

"The action of the Camoquin was felt with the same intensity on the sexual forms, as well as on the asexual ones, in both plasmodia (*P. vivax* and *P. falciparum*); after the ingestion of the drug there was no repetition of the attacks of fever and it, when present, disappeared, at the latest, after ten hours. There were 31, 46% of relapses. He concludes Camoquin to be one of the good quinoleic antimalarial medicaments."

SWELLENGREBEL, N. H. Réflexions à propos de la Conférence sur le paludisme de Kampala (1950). [**Reflections on the Malaria Conference, Kampala, 1950.**] *Ann. Soc. Belge de Méd. Trop.* 1951, Feb. 28, v. 31, No. 1, 111–19.

Protection against the ill effects of malaria lies in premunition, in its full form it gives freedom from ill effects. It is regrettable that the line demarcating hyperendemicity was drawn at a point far from this perfect equilibrium and for this reason the Conference decided to give a new name—holoendemicity—to this state of perfect equilibrium observed by such authors as CHRISTOPHERS [this *Bulletin*, 1924, v. 21, 284], SCHWETZ *et al.*, (*Mém. Inst. Roy. Colonial Belge*, 1934, v. 3, No. 2) and FARINAUD and PROST [this *Bulletin*, 1940, v. 37, 289]. Although seen in Asian populations it is most common among Africans, but it is not universal in the highly malarious parts of Africa.

One of the main objects of the Conference was to consider whether one had the moral right to allow the continuation of this immunizing mechanism, particularly in the face of development of the country which might include the employment of labourers from elsewhere. Extensive researches at Gombero have demonstrated the full qualities of holoendemicity but our knowledge is still inadequate, and it is possible that a population in this state might benefit from malaria control. In all these circumstances of doubt and ignorance one member of the Conference insisted on the unconditional application of control to every such area, rejecting even cautionary warnings, but the Conference agreed that in such areas campaigns should be accompanied by a profound study of the health of the population which should commence before control and be continued throughout it and after it should the campaign be prematurely abandoned. Our knowledge needs amplification which can be provided by practical test of control, but this test can be carried out only on the condition that it should be accompanied by scientific research, and it is in this insistence that the Conference proved its worth, an insistence likely to be accepted by the Directors of Medical Services of East Africa.

[Farinaud and Prost, in describing the state of perfect balance, summarized their opinions in saying :—

> ". . . beaucoup de ces peuplades, si robustes en apparence, sont frappées de stagnation, ou même en voie de disparition".

The objective reader is referred to the text of the Conference recommendation, which is not in fact conditional.] *G. Macdonald*

KNIPE, F. W. **Malaria Control Symbols.** *Mosquito News.* 1950, Dec., v. 10, No. 4, 169–98, numerous figs.

The conduct of malaria surveys and the management of insecticidal programmes are facilitated by the free use of maps on which are entered symbols representing such things as topography, water types, drainage systems, house types, entomological findings and construction work. One worker in any particular area may need to use only a limited number of such symbols, but there is a need for a dictionary of them which should be international in character so that survey maps and the detailed information which can be entered on them

by this method can be exchanged and compared without elaborate verbal description.

The author has from much experience prepared such a dictionary of symbols intended to cover all possible needs of the malariologist. He has, so far as possible, followed accepted methods but in much of the work it has been necessary to devise new symbols.

The symbols are very detailed and it is, for instance, possible to distinguish between bridges and culverts and those which are good, with too high or too low inverts. The reviewer's criticism of this detail is that while adhering logically to the principle of symbols in preference to words, it also introduces much added difficulty in mastering the system. *G. Macdonald*

i. PAMPANA, E. J. Lutte antipaludique par les insecticides à action rémanente. Résultats des grandes campagnes. [**Malaria Control with Residual Sprays. Results in Major Campaigns.**] *Bull. World Health Organization.* Geneva. 1951, v. 3, No. 4, 557–619, 11 figs. (6 maps). [50 refs.]

ii. SIMMONS, S. W. & UPHOLT, W. M. **Disease Control with Insecticides.** *Ibid.* 535-56. [104 refs.]

The first paper, by the chief of the Malaria section of the World Health Organization, is a commendable world-wide review of the results of antimalaria campaigns in which control has been attempted almost exclusively, or exclusively, by the destruction of adult mosquitoes by indoor deposits of residual insecticides. A great deal of information is presented in the text and in tables, figures, and maps. The results for many territories are those available up to about December, 1950, and in many cases have not previously been published. There is a bibliography of 50 references from which much detail has been carefully abstracted. Certain well-known schemes, such as those of Sardinia and Cyprus, are merely mentioned, since antilarval work was an important part of these campaigns.

The second paper provides brief notes on malaria control by various methods in Porto Rico, Panama, Trinidad and Tobago Island, Holland, Spain, Sardinia, Cyprus, Elba, Palestine, Malaya, New Guinea, and New Hebrides, all areas not discussed in the first paper. Such data as this second paper presents on the control of malaria in the U.S.A., Italy, Greece, Venezuela, Chile, Brazil, Mauritius, and India, are better dealt with in the first paper. The amount of information in this second paper is slight and somewhat sketchy, and results of campaigns, quoted from the literature, are rarely more recent than 1948. This paper also reviews some evidence of the effects of residual insecticides on various diseases other than malaria.

i. The following notes deal entirely with the first of the two papers in question and they indicate the general substance of Dr. Pampana's compilation. The author deals with the subject by continents.

Africa

Doubts as to the efficacy of DDT against the adults of *A. gambiae* and concern at the risks involved in interfering with the immune state of peoples in endemic areas, have been responsible for African territories being less advanced than other countries in developing extensive control programmes with DDT or other residual insecticides. However, some campaigns have been initiated in Africa and the author hopes that the results, which he summarizes, from other countries will encourage further work in the African continent.

Transvaal.—Transmission of malaria by *A. gambiae* and *A. funestus* affects over 1 million persons. Beginning in 1944, DDT was applied thrice yearly to

huts and houses at 1 gm. per square metre. Some antilarval work makes it impracticable to attribute results solely to the residual sprayings. Blackwater fever ceased to occur and spleen and parasite rates fell spectacularly.

Madagascar.—No results are yet available of an extensive campaign begun in 1949. DDT, octochlor, and BHC have been used and swamps have been treated for larvae by helicopter.

Mauritius.—A central zone of the island had already been cleared of malaria vectors when a major island-wide programme was begun in January, 1949. DDT at 1·7–2·58 gm. per square metre was used in the area extending from the central zone to the coast, except in the north, where BHC was tried at 25 mgm. of the gamma isomer per square metre. Treatments were applied twice in 1949 and a third, entirely with DDT, was in progress in 1950. By June, 1949, *A. funestus* had apparently disappeared (and also *Aëdes aegypti*), but *A. gambiae* was still abundant. The former is the principal vector transmitting throughout the year. A significant effect of the 1949 campaign was detected in the general, infant, and malaria mortality rates, which were respectively 27·2/1000, 150/1000, and 32/10,000 inhabitants before the campaign and 16·6/1000, 91/1000 and 12·9/10,000 after it. Percentage spleen and parasite rates in several thousand children were, respectively, 34·8 and 9·5 in 1948 and 2·8 and 0·36 by 1950. A population of about 400,000 has been protected.

S. Rhodesia.—Houses and huts in an area on the upper Mazoe basin were treated once with DDT in 1949 and three months later with BHC, some Europeans refusing the BHC application. Reductions in hospital admissions for malaria, and other evidence, indicate a satisfactory result.

America

It is noted first that anophelines and indigenous malaria appear to have been eradicated from *Chile* since 1945 by a combination of DDT residual spraying of premises, and even animals, with DDT antilarval work.

There are considerable details of the following nation-wide campaigns against adult vectors.

Argentina.—The vectors are *A. pseudopunctipennis*, *A. albitarsis*, and probably *A. darlingi*, transmitting malaria of epidemic or endemic degree to about 1½ million people. Control began in 1947 with 2 gm. DDT per square metre, laid down twice at intervals of 3 months during the transmission season. Walls of bedrooms and living rooms up to 3½ metres from the floor, and ceilings (only if low) were sprayed. Only 2,785 cases of malaria were notified in 1949, comparing favourably with 300,000 in pre-war years.

Bolivia.—*A. pseudopunctipennis* and *A. darlingi* are vectors of epidemic or endemic malaria among some 2 million people. Residual spraying began after 1946, deposits of 2 gm. DDT per square metre being laid down at intervals of 6 months. Representative results based on examination of children showed great reduction in spleen rates and parasite rates.

Brazil.—About 17½ million people were exposed to epidemic or endemic malaria transmitted by *A. darlingi*, *A. tarsimaculatus* and *A. albitarsis* with, in addition, some transmission by the bromeliad-breeders *A. cruzii* and *A. bellator*. The large residual spraying campaign began in 1947, applications being made twice a year at the rate of 1·5–2·5 gm. DDT per square metre. Limited use has been made of BHC and chlordane. By 1950, some 12 million persons were protected and the scope of the work was being extended progressively. Total malaria cases from areas first treated in 1947–48 dropped from 18,297 (1945) to 3,801 (1948) and 976 (1949) and percentage parasite rates for one district were 29·09 (1947), 5·71 (1948) and zero (1949).

Ecuador.—Most of the population of 3½ million suffered from malaria transmitted by *A. albimanus* and *A. pseudopunctipennis*. Beginning early in 1949, houses (and animal and poultry sheds in some areas) were treated thrice yearly with DDT at 2 gm. per square metre. Limited areas, where control of triatomid bugs was also sought, were treated with BHC. Just under 1 million persons have already been protected, but no data have yet been compiled for malaria incidence.

United States of America.—Although a general decline in malarial incidence had been characteristic for this vast area for many years, it was considered in 1938 that 27 millions out of the 150 million inhabitants were seriously affected by malaria, with about 4,000 deaths annually. Vectors included *A. quadrimaculatus*, *A. freeborni*, *A. crucians*, *A. punctipennis*, *A. walkeri* and *A. albimanus*. Residual spraying at 1 gm. DDT per square metre twice yearly began on a wide scale in 1947 in the 13 malarious States, but this was altered later to 2·1 gm. DDT per square metre once each year in 12 of these States. Walls, ceilings, backs and undersides of furniture, latrines, and porches were sprayed. In some circumstances, anti-larval measures were maintained. Malaria mortality per 100,000 persons for the 13 States was about 10–12 deaths in the early nineteen-thirties and 0·4 in 1948. Total cases of malaria occurring in these States in 1935 amounted to 135,781 but only 4,229 in 1949, and deaths from malaria fell from 4,252 (1935) to 142 (1948). Not all these cases can be taken as indigenous. It is difficult to differentiate the results attributable to residual spraying against adult vectors from the benefits due to antilarval measures and improvements in public health practice.

British Guiana.—Continuous transmission by *A. darlingi* breeding in rice and sugar plantations behind the coastal sea-wall caused endemic malaria in 90 per cent. of a population of about 425,000 inhabitants. A major control programme began in January, 1947, treatments of 1·6 gm. DDT per square metre being applied to houses at intervals of 8 months. The interval was increased to 18 months by 1950. Cases of malaria are now rare. None of 2,060 infants born in 1949–50 in formerly hyperendemic areas was positive for malaria. Percentage spleen rates of 40 to 70 in 1945 dropped to 1·5 to 4 by 1948 ; percentage parasite rates from 40 or 55 in 1945 to 0 or 3 by 1948.

Mexico.—A control campaign in which 1·6–2·6 gm. DDT per square metre was used as a residual deposit once or twice a year was begun in 1947–48. Some antilarval treatment is done in townships. Detailed results are not yet available.

Peru.—*A. pseudopunctipennis*, *A. albimanus* and *A. punctimacula* transmit malaria among about 3 out of 8½ million of the population. Since 1946, residual deposits of about 2·4 gm. DDT per square metre have been laid down once a year on walls and ceilings of houses and stables. The population has not yet been fully protected. Malaria cases show some decline from 57,993 (1946) to 30,188 (1949), and percentage parasite rates for certain areas were 6·2 to 13·4 before the campaign and 0·04 to 0·3 in 1949.

Venezuela.—About 20 per cent. of about 4½ million people are exposed to malarial transmission by *A. darlingi*, *A. albimanus*, and *A. pseudopunctipennis*. From about 1945 to 1948, an anti-adult programme of spraying houses, verandahs, stables, latrines and other premises with 1 gm. DDT per square metre every 3 or 4 months was carried out, but this was then changed to twice the dosage every 6 months. *A. darlingi* has been reduced more effectively than *A. albimanus*. Percentage spleen rates in one hyperendemic area of 72·7 to 98·6 (1941–45) dropped to 15·5 (1949), but in one epidemic area the data are less conclusive being 1·1 to 33·7 per cent. (1941–45) and as high as 3·1 per cent. in 1949.

Asia

There are limited campaigns in Afghanistan, Indonesia, Thailand, Viet-Nam, and numerous states in India, and the author selects the following larger projects. There is no information available about the scheme in Persia.

Ceylon.—Most of the 72 million inhabitants are exposed to epidemic or endemic malaria transmitted by *A. culicifacies*. The endemic and hyperendemic zone covers two-thirds of the island. The control campaign, which was planned to cover all communities with spleen rates over 10 per cent., as well as healthy areas subject to epidemics, began at the end of 1946. At first residual deposits of 2·1 gm. DDT per square metre, then 1 gm., and now 0·5 gm. were laid down at intervals of about 7 weeks. Some BHC has been used. Direct protection for 2½ million people and indirect for about 4½ million has now been accomplished. *A. culicifacies* is now very rare in houses and its larval density is low, despite increased numbers of larvae of other species. Data for general mortality per 1,000 persons are as follows : 24·8 (1928) ; 20·3 (1946) 14·3 (1947) and 12·6 (1949). Infant mortality per 1,000 live births was 177 (1928) ; 141 (1946) ; 101 (1947) and 87 (1949), decrease being most marked in formerly hyperendemic areas. Examinations of about 150,000 cases annually give these percentage spleen rates in March, averaged from 21 districts ; 21·2 (1938) ; 18·4 (1941) [both non-epidemic years] and, after the campaign began, 10·3 (1947) ; 5·8 (1948) and 2·7 (1949). The spleen rate in 186,550 children in 1949 was 1·8 per cent. Percentage parasite rates were 4·5 (1938) and 3·7 (1941) before, and 0·6 (1948) and 0·2 (1949) after, control by residual spraying had begun. The size of sample varied from 12,427 and 21,644 persons. Maps show that the hyperendemic dry zone averaged over 60 per cent. for spleen rates in 1938 but mainly less than 10 per cent. by 1949.

India

Only the following two campaigns are discussed in any detail :—

Bombay State.—A population of about 30 million is at risk to malaria. A control campaign is being progressively extended to cover the State. In the beginning it consisted of one scheme against the anthropophilic vector, *A. fluviatilis*, transmitting from December to June in the Kanara district, and a second scheme against *A. culicifacies*, partly zoophilic, in the Dharwar district, where the transmission season is from July to November. The time of these seasons enables the same equipment to be used for both schemes. The residual spray is applied at 0·5–0·7 gm. DDT per square metre, three times in a transmission season. In the *fluviatilis* terrain only house walls up to 3 metres from the floor are sprayed but in the presence of the zoophilic *culicifacies* animal shelters as well as houses are treated. Results in Kanara show a 1 per cent. parasite rate in infants in treated villages but 13 to 27 per cent. in those of untreated villages. A zero index in treated villages of Dharwar is less clearly distinct from 2 per cent. parasite rates in untreated villages, but the area had enjoyed low endemicity formerly, owing to earlier control measures. It is considered that malaria morbidity is reduced by 300,000 cases per year in the treated areas of the state.

Delhi Province.—About 300,000 persons are in malarious country, *A. culicifacies* being the vector from July to November. Since 1947, DDT at 0·54 gm. per square metre has been applied twice a year to houses and stables in villages with over 20 per cent. spleen rates, once yearly if the rates were 5–20 per cent. and not at all if lower spleen rate values prevail. Spleen rates in rural areas fell from 29·3 to 10·3 per cent. and numbers of malaria cases in urban districts were 32,405 (1945), 27,868 (1946) and 9,202 (1949), while in rural areas the figures were 18,344 cases (1945), 13,502 (1946) and 4,663 (1949).

Europe

Greece.—Five million of a population of 8 million occupy malarious regions, and the disease has been the ninth in importance as a cause of death, and second in importance in infant mortality. Something like 1–2 million cases occurred annually from 1930 to 1940, and spleen rates of 25 to 100 per cent. in school children were recorded. The vectors are *A. sacharovi* and *A. superpictus.*

A campaign of residual spraying once a year with DDT at 1·8 gm. per square metre began in 1946 and extended over all malarious regions by 1949. Houses, stables, and all rural buildings were treated. In urban and semi-urban areas some antilarval work at 0·02 gm. DDT per square metre of water surface was done at intervals of 10–15 days and large swamps and lakes have been sprayed from aircraft at 0·012 gm. DDT per square metre at intervals of 23–50 days. The percentage parasite rate in school children has fallen from 16·36 before the campaign to 0·1 in 1948 ; the infant parasite rate became zero. An estimate computed from hospital and army returns and malarial drug consumption indicates a fall from 100,000 cases of malaria in 1946 with 500 deaths, to between 15,000 and 20,000 cases annually in 1947–49, with deaths approaching zero.

Italy.—About 4 million of 46 million inhabitants live in malarious regions, transmission being by *A. sacharovi*, *A. superpictus* and *A. maculipennis labranchiae.* In the early 20th century there were something like 5,000 cases of malaria per million inhabitants, with 200 deaths per million per year. In 1946, an extensive civilian programme of residual spraying was begun, houses and stables being sprayed once yearly at 1·5–2 gm. DDT per square metre. Anti-larval measures were discontinued except in some populous areas. In 1948, 2,012 cases of malaria, with 0·08 deaths, occurred per million persons, and in 1949 only 422 cases per million and no deaths.

Portugal.—Anti-adult control by residual spraying began in 1948. DDT is used in one area and BHC in another. Treatment is given once each year. No results are yet available. The vector is *A. maculipennis atroparvus.*

Yugoslavia.—About 5 million of the population of 16 million are subject to malaria transmitted by *A. m. labranchiae*, *A. sacharovi* and *A. superpictus.* From 1947 onwards, all houses and animal sheds in malarious areas have been treated at 1 gm. DDT per square metre. Some antilarval control from the ground and from the air was continued. A reduction from 63,163–244,769 malaria cases per annum in 1932–39 to 8,562 cases in 1949 is probably due partly to DDT and partly to the decline of a post-epidemic phase.

The costs of these various campaigns are given in the original paper either as total cost or per square metre, per protected inhabitant or per treated building. The cost is expressed in the currency of the country, but exchange rates with the U.S. dollar are quoted in parenthesis. DDT was used in solution, suspension, or emulsion.

The author sums up his review by commenting that the malaria which affected some 470 million people in all these countries is being eliminated. It has ceased to be a public health problem in many territories where it was mainly a disease of the rural districts. The review was written at the instigation of the Executive Council of W.H.O. in the hope that the type of results which have been obtained will encourage the authorities in other malarious territories to initiate similar campaigns against the adult vectors of the disease.

ii. The best parts of this paper are the promising title and a bibliography of 104 references. The authors do not claim that the review is comprehensive and, since the manuscript was received for publication in July, 1950, and the 104 references include only 17 later than 1948, the review is not only incomplete but somewhat out of date.

The subject of disease control is dealt with under these headings :—mosquito-borne diseases (malaria, yellow fever, dengue, encephalitis, filariasis) ; louse-borne diseases (typhus, relapsing fever) ; flea-borne diseases (murine typhus, plague) ; fly-borne diseases (enteritis, diarrhoea, dysenteries, and cholera; sandfly fever ; leishmaniasis ; onchocerciasis ; trypanosomiasis ; bartonellosis) ; hemiptera-borne diseases (Chagas's disease) ; mite-borne diseases (tsutsugamushi fever and scabies) ; tick-borne diseases (relapsing fever) ; and miscellaneous diseases (diphtheria carriage by cockroaches, and bilharziasis).

Some indication of the scope of the notes on malaria control is given above. Under the heading of the various other diseases the authors give very broad indications of some of the controls attempted and results obtained either with residual insecticides or the methods formerly available. There are important omissions [*e.g.*, the use of BHC for the control of *Ornithodorus* and relapsing fever in Africa]. The review is compiled from published papers and abstracts of papers where the originals were not available ; it appears to serve its purpose as a guide to the literature of the subject, mainly for the years 1946 to 1948.

D. S. Bertram

i. DE SANDE, A. G. Campaña profiláctica antipalúdica con Gammaexano en Motril, durante el año 1949. [**Malaria Prophylaxis with** *gamma* **Benzene Hexachloride in Motril, Spain, in 1949.**] *Rev. Sanidad e Hig. Pública.* Madrid. 1950, Sept., v. 24, No. 9, 651–8, 1 fig.

ii. LOZANO MORALES, A. & JUÁREZ JUÁREZ, E. Consideraciones sobre una campaña de pulverizaciones residuales de la zona palúdica del río Tiétar (Cáceres). [**Malaria Prophylaxis with Residual Insecticides in the Malaria Zone of the River Tiétar Area, Cáceres, Spain.**] *Ibid.* Nov.–Dec., Nos. 11/12, 803–16.

These two papers record the success of recent house spraying campaigns in Spain, directed against the malaria vector *Anopheles maculipennis*.

i. Malaria was prevalent in the town of Motril and neighbouring districts, but the large number of houses, (15,000), rendered a complete house-spray programme rather expensive. Therefore, the residual insecticides were applied to 722 houses and 230 stables on the peripheries of the towns and villages. The treatment applied was *gamma* BHC at 0·5 gm. per sq. metre. In 1948, one spraying was done in May and a second in July ; in 1949, the first treatment was made in March and the second in May.

As a result of the spraying, no *Anopheles maculipennis*, either larvae or adults, were observed in 1949 ; though plenty of culicine larvae were seen. This absence of the vector was accompanied by a great reduction in malaria. Primary and secondary (relapses and recurrences) cases in the district in different years were as follows :

	1945	1946	1947	1948	1949
Primary	51	178	205	54	1
Relapses, etc.	67	38	82	107	4

ii. Extensive antimalarial house-spraying was carried out in the marshes of the river Tiétar in a large area containing a number of small towns. The region comprised 800 square kilometres with 40,000 inhabitants, about half of whom were living in the epidemic zone near the river. These people were mainly

cultivators of pimento and tobacco, living under conditions which favoured frequent contact with the mosquito. Cattle, for example, were not numerous, so that man was the primary host.

In 1949 and 1950, extensive house-spraying was conducted ; in the first year with *gamma* BHC (0·5 gm. per sq. metre) in the second year with 50 per cent. of DDT added. Two sprayings were carried out ; the first between March and May, the second between July and September. By 1950, it became evident that the houseflies were becoming resistant to the insecticide. This was bad for public relations, because it appeared that the insecticide spraying was useless. Nevertheless, the results proved that the lethal action on the mosquitoes was maintained ; and this was the object of the campaign.

The results are indicated by the effect on the malaria cases recorded by the 59 dispensaries in the province. The total positives in 1948, 1949 and 1950 were respectively 9,174, 5,678 and 2,881. Further data are given of two principal zones of the province which are also analysed into smaller districts. It is concluded that the spray treatment has definitely lowered the incidence of malaria. *J. R. Busvine*

KEYS, D. N. **Gammexane (Benzene Hexachloride) Water Dispersible Powder as a Larvicide in Estate Anti-Malarial Control.** *Med. J. Malaya.* 1951, Mar., v. 5, No. 3, 220–29.

A water dispersible powder (gammexane P.520) containing 6½ per cent. of the *gamma* isomer of BHC was tested as a larvicide in agricultural drainage systems in which *Anopheles maculatus* and *A. karwari* commonly bred. The water suspension used originally contained 4 ounces of the powder to 1 gallon, but this was later reduced to 1 ounce. The intention was to spray at the rate of 1 gallon to 220 yards of channel with an average width of just over one yard (about 24 gallons to the acre). Almost complete destruction of anopheline larvae was secured. After six trials covering 4,196 yards many dead larvae were recovered and careful search revealed larvae in only four small pools which might have been overlooked. There was no apparent effect on eggs or pupae and breeding was re-established more rapidly than after oiling. The costs were less than those for oiling, the insecticide being cheaper and less cleaning being needed. It is concluded that the powder is as effective as the previous oil mixtures and less costly, but greater regularity is needed owing to its lack of effect on eggs or pupae or vegetation. *G. Macdonald*

RAFFAELE, G. & BALDI, A. Sulla morfologia e sulla trasmissione di " *P. berghei* " (Vincke e Lips). [**Morphology and Transmission of** *P. berghei*.] *Riv. di Malariologia.* 1950, Dec., v. 29, No. 6, 341–7, 35 coloured figs. on pl. English summary (5 lines).

The authors first describe the morphology of the developmental stages of *Plasmodium berghei* in the blood [? of mice], which agrees in general with the original account of VINCKE and LIPS [this *Bulletin*, 1948, v. 45, 979]. It is stressed that in the natural host the infection is light and the red cells usually harbour single parasites, whereas in heavy infections of laboratory rodents the normal relations are obscured by multiple infections of the host-cell. Thus, the crowding of trophozoites may simulate segmentation, especially when their individual margins are indistinct, and a red cell containing more than 20 merozoites, though produced by several schizonts, may be attributed to one schizont, which normally gives rise to 10–14 merozoites.

In schizonts the pigment is usually arranged in 2–4 small blocks, but in trophozoites it is sometimes invisible in stained films, but can be detected in fresh preparations. The infected red cells may be enlarged, especially those with multiple infections, and exhibit basophilic staining. The macrogametocytes, which are oval with the nucleus at one end, are larger than the microgametocytes. The appearance of the parasites in the blood is illustrated by a coloured plate.

The authors successfully infected mice and rats with *P. berghei*, but failed to infect guineapigs and rabbits. In mice, the parasites usually appear in the blood 4–8 days after inoculation and the parasitaemia rapidly increases, until the animal dies. In most cases death occurs during the first fortnight, when the percentage of infected red cells exceeds 50. The course of the infection in rats depends upon their age. In adult animals it usually runs a benign course, the parasites appearing in the blood between the 5th and 12th day, after which their number gradually decreases and the animals recover spontaneously. However, in young rats the course of the infection is similar to that in mice, with a high parasitaemia and fatal termination. Microscopical examination of new-born rats from infected mothers showed no evidence of congenital infections.

Attempts were made to infect Culicine mosquitoes, *Aëdes aegypti* and *Culex pipiens*, by feeding them on infected mice and rats, but subsequent examination of their stomachs and salivary glands failed to reveal any developmental stages of *P. berghei*. *C. A. Hoare*

BALDI, A. Sul quadro anemico nell'infezione da " *P. berghei* " (Vincke e Lips). [**The Blood Picture in Infections with** *P. berghei*.] *Riv. di Malariologia*. 1950, Dec., v. 29, No. 6, 349–56, 6 coloured figs. on pl. English summary (5 lines).

An account is given of the blood changes in mice and rats infected with *Plasmodium berghei*. When parasitaemia in mice exceeds 50 per cent. of the erythrocytes, the blood picture undergoes profound changes : in addition to rare infected and uninfected normoblasts, the blood film contains numerous enlarged erythrocytes with multiple infections, as well as fragments of the parasites and free merozoites. In this phase there are also many parasitized erythroblasts. That enlargement of the red cells is not due to the presence of parasites in them is evident from the fact that the enlargement is moderate at the beginning of the infection but increases as parasitaemia and anaemia develop ; moreover, the macrocytes persist after the parasites have been eliminated by antimalarial treatment.

The behaviour of the red cells in infected mice was studied in blood films stained supravitally with brilliant cresyl blue. It was found that, as parasitaemia progressed, there was a considerable increase in the number of reticulocytes, which rose from 10 per cent. at the beginning to 50–60 per cent. at the height of infection. During this period the parasitized reticulocytes still contained a dense network. After removal of the parasites by antimalarials, the number of reticulocytes remained high for 4–5 days, after which it fell to almost normal values.

In films stained by Giemsa's method, the blood showed rare polychromatic red cells with a tendency to basophilia, which was usually granular but sometimes diffuse. Basophilia appeared to increase parallel with the reticulocytes and parasites. Since the parasites show a predilection for immature red cells (basophils and reticulocytes), the abundant emergence of the latter into the circulation—due to acceleration of haematopoiesis—favours the development of unrestricted parasitaemia, which kills the host within a fortnight, before its defence mechanism can be mobilized. In adult rats the blood changes are less

marked and these animals are able to resist the infection and recover spontaneously, whereas in young rats the conditions of erythropoiesis are still of the embryonic type, therefore the infection runs an acute and fatal course, as in mice. The blood changes are shown in coloured plates, depicting side by side the appearance of the cells when stained by Giemsa's method and with brilliant cresyl blue.

The author then describes the development of anaemia in infected mice. The infection brings about extensive anaemia, with a rapid fall in the number of erythrocytes from about 12 million to 1–2 million per cmm., while the haemoglobin index rises from 1·50 to 2–3. The author believes that these conditions also favour the multiplication of the parasites.

These observations have thus shown that, in mice and young rats, infection with *P. berghei* is accompanied by an increase in reticulocytes and basophilic red cells, macrocytosis, and anaemia of the hyperchromic type.

In mice, antimalarial treatment is effective only when started early in the infection but when it is far advanced the drugs are unable to eliminate the parasites. *C. A. Hoare*

TRAGER, W., STAUBER, L. A. & HAREL, S. B. **Innate and Acquired Agglutinins in Ducks to the Malaria Parasite** *Plasmodium lophurae*. *Proc. Soc. Exper. Biol. & Med.* 1950, Dec., v. 75, No. 3, 766–71.

It has previously been shown that a proportion of ducks are naturally resistant to infection with *Plasmodium lophurae*, owing to the presence of certain factors in their plasma, which have an antiplasmodial effect when injected into infected ducklings, and agglutinates the parasites *in vitro* [this *Bulletin*, 1947, v. 44, 967 ; 1949, v. 46, 446 ; 1950, v. 47, 816]. In the present paper the authors report the results of further experiments on the nature of this phenomenon. It was found that fresh plasma from normal (uninfected) ducks agglutinated erythrocyte-free suspensions of *P. lophurae*, the agglutinating activity being more marked in older ducks than in young ones. Agglutination was rarely produced by plasma beyond a 1 : 4 dilution, and was completely absent in plasma heated for half an hour at 55–56°C. In infected ducks these heat-labile agglutinins usually decreased as the infection progressed, and disappeared entirely at the height of a severe infection. However, in the plasma of most of the infected birds, the heat-labile agglutinins were replaced by heat-stable agglutinins, which could not be demonstrated in undiluted plasma but were frequently active in plasma diluted up to 1 : 1,000. In ducklings infected when they were not older than one month, heat-stable agglutinins failed to develop, while the heat-labile agglutinins disappeared at the height of the infection. But if these ducklings were treated with quinine, the heat-labile agglutinins reappeared. In relapses, heat-labile agglutinins were absent. *C. A. Hoare*

LAIRD, M. *Plasmodium lygosomae* **n.sp., a Parasite of a New Zealand Skink,** *Lygosoma moco* (**Gray, 1839**). *J. Parasitology*. 1951, Apr., v. 37, No. 2, 183–9, 13 figs. on pl.

The author examined the blood of nine skinks (*Lygosoma moco*) near Wellington, New Zealand, and discovered a new species of *Plasmodium* (*P. lygosomae*) in two, and haemogregarines in five. The malaria parasite was amoeboid and irregular in shape (with " D " and spindle forms) and density, with small fan-like schizonts, and ovoid or reniform gametocytes containing many round granules of black pigment. Exo-erythrocytic schizonts were found in thrombocytes and lymphocytes in smears of heart blood. Some extracellular forms were found. They contained no pigment ; they possessed

vacuolated cytoplasm staining deep blue with Giemsa's stain, with up to 20 nuclei. The author considers that *P. lygosomae* may have to be considered a synonym of *P. lacertiliae* from New Guinea. *P. C. C. Garnham*

TRYPANOSOMIASIS

LOURENÇO MARQUES, MOÇAMBIQUE. Missão de combate às tripanosomiases. Relatório anual de 1949. [**Annual Report for 1949 of the Trypanosomiasis Commission.**] 75 pp., 7 folding maps (6 coloured). 1950, Lourenço Marques : Imprensa Nacional de Moçambique.

The formation, constitution and programme of work of the Mission was fully described in the Report for 1947 [this *Bulletin*, 1949, v. 46, 984] ; in the Report for 1948 [*Ibid.*, 1951, v. 48, 339] some unfinished experimental work is mentioned and is considered further in the present Report. At Salamanga in the Maputo area, where the only sources of food of the local tsetse fly, *Glossina brevipalpis*, are cattle and hippopotami, dipping tanks containing DDT and Gammexane were used and the hippopotami were "persecuted" [driven away ?]. A great reduction in the number of tsetse flies caught on fly-rounds followed ; 2,348 flies were caught in November and December 1948, whereas in the same months of 1949 only 64 were caught. Another investigation was made to determine the relative index of infection in the four species of tsetse fly (*G. morsitans*, *G. pallidipes*, *G. brevipalpis*, and *G. austeni*) which occur together in the Sitatonga area ; this was continued during 1949 and a special report was to be given. This work showed the great importance of *G. austeni* as a host of pathogenic trypanosomes and the biological study of this fly is being continued. No salivary gland infection was found in the dissection of 18,334 flies of the four species, including 3,474 *G. morsitans*.

Measures of tsetse control included grass-burning, disinfestation posts on the roads, game fences and game destruction.

Sleeping sickness.—The endemic area remained as before ; 356,268 Africans were examined and 184 new cases were found, a rate of 0·51 per 1,000. Most of the patients were treated with antrypol and tryparsamide and some received pentamidine isethionate.

Chemoprophylaxis.—Antrypol was given in two doses, 0·5 gm., and 1·5 gm. two days later ; other groups received (or would receive) three doses of 5 mgm. / kgm. of pentamidine isethionate, the doses being at intervals of several months. The results will be published on completion of the experiment.

The Report includes tables of species of game killed and of biting flies and ticks identified. Several scientific papers by the staff were published during the year. *J. F. Corson*

INFORMATION, CENTRAL OFFICE OF : EMPIRE INFORMATION SERVICES. British Commonwealth Leaflet Series B. **Wars not yet Won. No. 4. Tsetse Fly.** 10 pp. 2nd edit. 1951. London : H.M. Stationery Office. [6*d*.]

This pamphlet, which is one of a series dealing with the campaign against some tropical diseases, was first published in 1948. It now brings up to date the story of tsetse flies and trypanosomiasis and the measures used to control them.

The pamphlet gives an adequate account of the problems in a form suitable for the general reader [but there is nothing specifically to indicate who that reader is primarily intended to be]. *H. J. O'D. Burke-Gaffney*

TRINCÃO, C. & DE GOUVEIA, E. **The Blood and Bone Marrow Pattern in Sleeping Sickness in Portuguese Guinea.** *Amer. J. Trop. Med.* 1951, May, v. 31, No. 3, 335–40, 4 figs.

"Blood and bone marrow cytologic studies were made on 32 cases of sleeping sickness seen in Portuguese Guinea.

"The blood picture of African trypanosomiasis can be summarized as follows: slight microcytic normochromic anemia, moderate leukocytosis with an increase of the monocytes and lymphocytes, and neutropenia with a shift to the left of Schilling's hemogram. The number of platelets is normal. Hemoglobin breakdown is increased, serum iron normal or elevated, normal icterus index and normal or decreased fragility of the erythrocytes.

"The bone marrow picture shows an increase of the erythroblastic series and a great number of immature megakaryocytes. Plasmocytes are slightly increased and Mott cells can be found."

VAN OYE, E. & PEEL, E. Contribution à l'étude de la cellule mûriforme de Mott dans le liquide céphalo-rachidien des trypanosés. [**Study of Mott's Morular Cells in the Cerebrospinal Fluid in Trypanosomiasis.**] *Acta Tropica.* Basle. 1951, v. 8, No. 1, 18–31, 23 figs. [23 refs.]

In his classical work on sleeping sickness published by the Royal Society in 1906 F. W. MOTT described certain large round or oval cells whose cytoplasm consisted of a number of clear spherules giving the cells a mulberry appearance. These he called morular cells and thought they were degenerated plasma cells. Mott's name has stuck to them for nearly half a century now but the authors of the paper under consideration point out that priority is due to Dr. Cuthbert CHRISTY who gave an account of these cells in a memoir of the Liverpool School of Tropical Medicine in 1904. So does the eponym distort history.

There has been a great deal written about the morular cell and much controversy has taken place about its origin. Following Mott the plasmocyte origin has been the most favoured and it is further strengthened by the present work.

It is not possible adequately to summarize the histological technique and the chemical processes on which the findings are based, and the whole paper should be studied by interested workers in this field.

The conclusion reached is that plasmocytes absorb and store lipins produced by the breakdown of brain cells attacked by the toxins of the trypanosomes. This accumulation causes the formation of vesicles in the cytoplasm and finally there is a mass of vesicles—a *morula* or mulberry. The morular cell is therefore far from being a degenerated plasma cell but rather one in full physiological activity.

Those who deny that the morular cell is specific in trypanosomiasis are warned not to mistake it for the plasmocyte with vacuoles which may be found in diseases other than trypanosomiasis. *H. G. Calwell*

LAPEYSSONNIE, L. Note sur l'emploi de la vitamine B1 dans le diagnostic de l'infection lymphatico-sanguine dans la trypanosomiase. [**The Use of Vitamin B1 in the Diagnosis of Trypanosomiasis in the Lymphatic-Blood Stage.**] *Bull. Méd. de l'Afrique Occidentale Française.* 1950, v. 7, No. 2, 217–19.

In cases of trypanosomiasis it is not always easy to discover trypanosomes in either blood, lymph or cerebrospinal fluid, although typical symptoms of the disease may be present.

Without laboratory facilities it is, moreover, impossible to state whether a raised cell content of the cerebrospinal fluid is due to syphilis or to sleeping sickness. Various methods have been used such as adrenaline injections and the use of vaccines and proteins in the fruitless attempt to provoke the appearance of trypanosomes in such cases. Since the publication by LWOFF that trypanosomes require for their development the presence of Vitamin B1, the author tried daily intramuscular injections of 10 mgm. of this vitamin in the form of Bévitine for five days. In two cases previously negative trypanosomes appeared in the blood, and in a third in the cerebrospinal fluid. It was unsuccessful, however, in two untreated and in two treated but uncured second stage patients.

C. C. Chesterman

KOERBER, R. A propos de quelques cas de trypanosomiase observés chez des Européens à Dakar. [**Some Cases of Trypanosomiasis seen in Europeans at Dakar.**] *Bull. Méd. de l'Afrique Occidentale Française.* 1950, v. 7, No. 2, 135–41.

These five case records show that there are areas in the vicinity of Dakar which are infested with tsetse flies : in these areas there is a human reservoir of trypanosomes, so that picnic and hunting parties run definite risks. A history of a recent visit to such spots should put the doctor on his guard and calls for repeated blood examinations, for symptoms of trypanosomiasis may appear in Europeans within a few days and long before any glandular enlargement is evident. Symptoms described are fever, headaches, vomiting, agitation, nightmares and hallucinations. A history of bites and a possible trypanosomal chancre are important.

One patient, though treated with pentamidine on the ninth day after exposure to infection, subsequently developed an altered cerebrospinal fluid which necessitated treatment with tryparsamide and moranyl.

C. C. Chesterman

DA SILVA, O. J. & FORATTINI, O. P. Nota sôbre a infecção natural de triatomídeos e de cão pelo *Trypanosoma cruzi*, em uma zona do rio Mogi-Guaçú, municípios de São Simão e de São Carlos, Estado de São Paulo. [**Natural Infection with *T. cruzi* of Triatomids and a Dog, in São Paulo.**] *Arquivos Facul. de Hig. e Saúde Pública Univ. de São Paulo.* 1949, Dec., v. 3, No. 2, 211–17, 6 figs.

The English summary appended to the paper is as follows :—

"The authors present a preliminary note on their investigations of Chagas disease, in a bordering region between São Simão and São Carlos townships, in the State of S. Paulo. They investigated two places, having found infected triatomas and a dog naturally infected.

"The triatomas, all of them from the *Triatoma infestans* species, showed themselves positive to a percentage of 80·5. The presence of *Trypanosoma cruzi* was demonstrated by the inoculation in mice."

WOOD, S. F. **Development of Arizona *Trypanosoma cruzi* in Mouse Muscle.** *Amer. J. Trop. Med.* 1951, Jan., v. 31, No. 1, 1–11, 36 figs. on 2 pls. [14 refs.]

According to some authors, in the course of development of *Trypanosoma cruzi* in the muscles of its vertebrate host there is an intermediate crithidial stage between the leishmanial and trypanosome stages. However, the present author, who has studied the development of Arizona strains of *T. cruzi* in white

mice infected by intramuscular inoculation of droppings from naturally infected triatomid bugs (*Triatoma protracta* and *T. rubida uhleri*), failed to find any crithidial forms among upwards of 5,000 parasites examined in impression smears of the muscle tissues stained by the Jenner-Giemsa method.

A detailed illustrated account is given of the transformation of the leishmanial forms into trypanosomes, which may proceed directly or indirectly. In the direct process, the rounded parasite first acquires a flagellum, which gradually increases in length, pulling the body with it, until the latter elongates and assumes the characteristic trypanosome form. In the indirect process, the growing flagellum adheres to the surface of the rounded body and gradually encircles it, reaching the region of the kinetoplast. At this stage a V-shaped indentation is formed in the body between the free anterior end of the flagellum and the kinetoplast area. As the indentation deepens, the anterior end of the body (with the free flagellum) separates from the posterior end (kinetoplast area), until finally the flagellate unfolds and assumes the trypanosome form. The author has found no evidence of the formation of the trypanosome form by migration of the kinetoplast. *C. A. Hoare*

BORZONE, R. A. El ojo de los chagasicos. Evolución de la oftalmia chagásica en la clínica y en la experimentación. [**The Eye in Chagas's Disease.**] *Semana Méd.* 1951, May 24, v. 98, No. 21, 812–13.

Professor Borzone speaks of inequalities in the eyes as seen in cases of Chagas's disease, the affected eye being microphthalmic or smaller than the unaffected. This has been called Borzone's sign and is thought to be a sequela of Romaña's sign. He speaks of three types of "small eye"; simple anisophthalmia, enophthalmic anisophthalmia, both due to peripheral lesions, and mixed or ptosic anisophthalmia described by Chagas and due to a combination of central and peripheral lesions. *H. Harold Scott*

LEISHMANIASIS

HO, E. A., YUAN, I-chin & CHU, Hai-ju. **On Canine Leishmaniasis and Human Kala-Azar in Peking and its Adjacent Villages.** *Chinese Med. J.* Shanghai. 1950, Sept.–Oct., v. 68, Nos. 9/10, 241-7. [13 refs.]

Previous records of canine and human visceral leishmaniasis pointed to the possibility of dogs acting as reservoirs of human kala azar in North China. In the present paper, the authors report observations carried out in 1939–1943 in Peking and its vicinity with the view to throwing further light on the relationship between the canine and human diseases. The prevalence of human kala azar was determined by the number of patients diagnosed in clinics, while that of dogs was based on house-to-house surveys, in the course of which the animals were examined by skin scrapings and iliac punctures. In Peking, the average annual incidence of human kala azar was 5·3 per 100,000 of the population, while among dogs 27 (1·1 per cent.) of 2,474 examined were found naturally infected. Among 130 cases of human and 35 cases of canine infections, there was only one instance of the two diseases occurring in the same household. "However," as the authors state, "the incidence of the canine disease was found to be definitely higher in the neighbourhood of patients' dwellings than for the city as a whole." In the villages, the annual incidence of human kala azar was 63 times greater than in the city, whereas canine leishmaniasis was absent in all but 3 (out of 50) villages. Of 1,780 dogs examined, 4 were found naturally infected.

It is concluded that " Parallelism between the incidence of the two diseases was not observed, and human kala azar apparently maintains its endemicity in absence of the canine disease ". [However, from the authors' own findings it would seem that in some cases, both in urban and rural districts, there was actually a coincidence of human and canine infection.] *C. A. Hoare*

FEVERS OF THE TYPHUS GROUP

VARELA, G. & ORTIZ MARIOTTE, C. Distribución del tifo murino, clásico, intermedio fiebre manchada y fiebre " Q " en la República Mexicana. [**Distribution of Fevers of the Typhus Group in Mexico.**] *Medicina.* Mexico. 1951, Mar. 25, v. 31, No. 624, 115–17, 1 map.

JACKSON, Elizabeth B. & SMADEL, J. E. **The Effects of Cortisone and ACTH on Toxins of Rickettsiae and** *Salmonella typhosa. J. Immunology.* 1951, May, v. 66, No. 5, 621–5. [10 refs.]

" In the current experiments the adrenal cortex of normal or infected mice apparently contributed as effectively as possible in the host's response to rickettsial or bacterial toxins and further stimulation was without advantage. Furthermore, no evidence was obtained in mice which would suggest that ACTH or cortisone has a direct antitoxic effect on the toxins of *Rickettsia tsutsugamushi*, *R. prowazeki*, or *Salmonella typhosa.*"

KAETHER, H. & BECKER, H. W. Ein sporadischer Fall von Fleckfieber. [**A Sporadic Case of Typhus Fever.**] *Med. Klin.* 1951, June 1, v. 46, No. 22, 645.

The author describes a proved case of louse-borne typhus in which the most likely mode of infection was the inhalation of infected dust stirred up by the patient while handling old clothes 14 days before the onset.

No other case of the disease was known to have occurred in the region of Westphalia during the previous two years and no further case occurred among persons who came into contact with the patient.

John W. D. Megaw

GISPEN, R., GAN, K. H. & WESTERMANN, C. D. **Endemic Typhus in Java. I. Incidence and Distribution of Shop Typhus.** *Documenta Neerlandica et Indonesica de Morbis Tropicis.* Amsterdam. 1951, Mar., v. 3, No. 1, 60–66, 1 map. [19 refs.]

The authors describe the isolation of a strain of rickettsia from a patient whose Weil-Felix titre against *Proteus OX19* rose to 1–6,400 and whose complement-fixation titre against the homologous strain and a rat strain of murine typhus isolated in Java was 1–64. Guineapigs immunized with these two strains and others immunized with an American standard strain of murine typhus were found to have identical complement-fixing antibodies. In several other cases of " shop typhus " in Djakarta (Batavia) attempts to isolate rickettsiae by guineapig inoculation had failed, partly because of the low virulence of the local strains and partly because the blood was often obtained at too late a stage of the illness. In the present case the guineapig originally inoculated showed only local scrotal swelling but in later passages there was a febrile reaction, with scrotal reaction in 15 out of 29 male animals which gave a febrile response.

Among 113 sera of persons chosen at random in two districts of Djakarta 8 gave positive fixation reactions at titres of 1–16 or over and it is estimated that the yearly number of infections in the city with its one-and-a-half million inhabitants must amount to many hundreds rather than the few tens hitherto detected.

In one hospital 45 patients were diagnosed between 1935 and 1941 as cases of shop typhus : these had occurred sporadically all over the city and rat infection, was detected in 7 different districts.

In Java as a whole there have been 284 suspected cases of shop typhus since 1929 ; their distribution points to an infection associated with human dwellings but not to a higher incidence in urban than in rural areas, nor to a special association with food shops or stores.

Although the evidence presented in the paper points strongly to the identity of shop typhus and murine, flea-borne, typhus the authors consider that further investigation is needed into the source and mode of transmission of the agent.

John W. D. Megaw

RICKARD, E. R. **Attempted Transmission of Murine Typhus to Roof Rats by the Ingestion of Food Heavily Contaminated with Infected Flea Feces.** *Amer. J. Trop. Med.* 1951, May, v. 31, No. 3, 311.

" Food known to be contaminated with viable rickettsias of murine typhus contained in infective flea feces was ingested by 20 roof rats. These rats remained uninfected as indicated by negative complement fixation tests on their sera."

WORTH, C. B. **Transient Presence of Complement-fixing Antibodies against Murine Typhus Fever in the Sera of Offspring of Immune Rats.** *Amer. J. Trop. Med.* 1951, May, v. 31, No. 3, 299–300.

" Sera of young roof rats and cotton rats born of mothers with high complement-fixing titers for murine typhus fever displayed low grade and diminishing titers of these antibodies for about two months. The presence of transient complement-fixing antibodies in offspring of rats immune to murine typhus might introduce a source of error in complement fixation surveys of this disease in rat populations."

PARKER, R. R., PICKENS, E. G., LACKMAN, D. B., BELL, E. J. & THRAIKILL, F. B. **Isolation and Characterization of Rocky Mountain Spotted Fever Rickettsiae from the Rabbit Tick** *Haemaphysalis leporis-palustris* **Packard.** *Pub. Health Rep.* Wash. 1951, Apr. 13, v. 66, No. 15, 455–63.

The description of the technical methods employed in this investigation will be found very interesting by all workers on the rickettsiae.

Two strains of *Rickettsia rickettsi* of low virulence (*H.l.p.*) were isolated by yolk-sac culture from 5 pooled suspensions, each of which was made from 62 rabbit ticks (*Haemaphysalis leporis-palustris*) collected from 6 cottontail rabbits (*Sylvilagus nuttallii*) in the Bitter Root Valley in July 1948. Five similar *H.l.p.* strains were isolated from 5 pooled suspensions of ticks of the same species collected from 22 cottontail rabbits in the same area in June to August, 1949. All the *H.l.p.* strains caused similar reactions in guineapigs, which were much less severely affected than by inoculation with the stock laboratory strain (*R. strain*) of *Rickettsia rickettsi*. The average incubation period was nearly twice as long, the febrile period was less than half as long, the scrotal reaction occurred in only 56 per cent. against 93 per cent., and was much milder when

it did occur ; there were no deaths, whereas the *R. strain* caused death in 90 per cent. of the infected animals. The post-infection immunity was the same in both strains, which gave complete protection against challenges with the *H.l.p.* and *R. strains* of Rocky Mountain spotted fever, maculatum fever, boutonneuse fever and South African tick-bite fever. Both strains gave partial protection against epidemic typhus, but no protection against murine typhus, rickettsialpox or Q fever.

Sera of guineapigs convalescent from infection with either strain reacted with the complement-fixation test at the same average titre irrespective of which strain was used as antigen.

Similar strains of low virulence are sometimes found in *Dermacentor andersoni* ticks and the authors suggest that these may be *H.l.p.* strains acquired by *D. andersoni* through feeding on rabbits harbouring infected rabbit ticks. No virulent strain has ever been recovered from *H. leporis-palustris*, which does not usually bite man, but may be of importance in maintaining *R. rickettsi* among wild rabbits. All stages of *D. andersoni* are also found on rabbits and are the ticks most concerned in the transmission of the infection to man in the western United States.

Only one of the cottontail rabbits from which the ticks used in the above experiments were collected was shown to have complement-fixing antibodies for Rocky Mountain spotted fever, whereas among 10 snowshoe rabbits (*Lepus americanus*), trapped at the same time, 8 gave positive reactions and *R. rickettsi* was isolated from *H. leporis-palustris* ticks picked from 3 of these.

In a previous survey carried out in the same general area in 1946 and 1947 the sera of 286 mammals were tested for antibodies of murine typhus, Rocky Mountain spotted fever and Q fever. Six out of 61 cottontail rabbits were positive for Rocky Mountain fever and one out of five porcupines reacted with Q fever antigen. *D. andersoni* ticks from one of two mountain goats yielded a strain of Q fever rickettsiae and a strain of *Rickettsia rickettsi*. *D. andersoni* larvae from one of the 46 sidestripes (*Citellus lateralis*) yielded a strain of *R. rickettsi*. *John W. D. Megaw*

CAMERON, H. **A Case of Q Fever.** [Memoranda.] *Brit. Med. J.* 1951, June 16, 1367.

A severe isolated case of Q fever is described ; the source of infection is said to be unknown and to be under investigation. [In a personal communication the author states that the enquiry has failed to elicit any clue to the origin of the infection and that the patient, a retired cavalry officer aged 58 years, was living in a small town in South-West Kent near the Sussex border.] The attack occurred in April, 1950. The onset was with rigors, profuse sweating and severe muscular pains. By the 4th day there were dyspnoea, cyanosis and signs of diffuse bronchitis. Full doses of sulphonamides and penicillin were given, without effect, and by the 7th day signs of consolidation of the upper lobe of the right lung were detected by physical and X-ray examination. The leucocyte count showed 2,800 white cells per cmm. ; with 29 per cent. lymphocytes. Cold agglutinins were present at a titre of 1–80.

On the next day there were spells of violent shooting pains in the face and limbs accompanied by severe twitching of the muscles. On the 9th day Q fever was suspected and aureomycin was given in doses of 0·5 gm. every six hours ; there was an immediate improvement, all the signs and symptoms disappeared within 36 hours except for a dusky red macular rash which was first noticed on the back on the 9th day and soon extended all over the body except the face.

The rash persisted for 14 days. Convalescence was rapid and complete.

The complement-fixation tests, carried out at the Virus Research Laboratory, Colindale, by Dr. B. P. Marmion, were positive at titres rising from 1–8 on the 10th day to 1–256 on the 35th day. *John W. D. Megaw*

BABUDIERI, B. Ricerche sulla febbre Q in Italia. [**Research into Q Fever in Italy.**] *Acta Med. Italica.* 1951, Jan. & Feb., v. 6, Nos. 1 & 2, 1–9 ; 29–38, 1 chart & 1 map. [93 refs.]

Although the author deals chiefly with Q fever in Italy, he also gives a comprehensive summary of recent investigations into the disease in the numerous areas in which it has been recognized ; he himself has made important contributions to knowledge of the disease, which he has studied in its bacteriological, epidemiological and clinical aspects, all of which are ably discussed in this paper. Strangely enough, little notice was taken in Italy of Q fever till the end of 1949, despite the fact that the historic outbreaks among the allied troops in 1945–46 aroused world-wide interest, thanks to the intensive manner in which they were investigated and publicized by American medical scientists. It now appears that the medical profession and general public of Italy are fully alive to the importance of the disease. The author estimates that there have been about 10,000 to 15,000 cases in Italy since the winter of 1949–50 ; in his own laboratory he has examined 3,450 sera of patients and cattle from various provinces of the country, and has found that about 31 per cent. of these gave positive reactions.

Only one case is known in which transmission to man by the bite of a tick was the probable mode of infection. In several outbreaks, including those affecting American troops in 1945–46, the inhalation of dust from straw or hay contaminated by contact with infected animals, appears to have been responsible for the infection. An interesting outbreak is described as occurring in a town 20 kilometres from Ancona, in which about 80 per cent. of the persons affected lived or worked in two streets along which a herd of cattle from the Appennines had repeatedly passed. Tests were carried out on 44 cattle, and 21 of them gave positive complement-fixation reactions at titres of 1–16 or over. Several other outbreaks were associated with similar conditions, and in one of them it was suggested that pigeons were acting as intermediaries in the transfer of infection from the animals to man ; among 26 pigeons 3 were found to have complement-fixation titres of 1–8 to 1–32 and it seemed likely that they had been infected by eating material contained in the droppings of the cattle. In most of the above outbreaks alimentary infection by milk or milk products could be excluded.

A remarkable outbreak is mentioned as having occurred in the pathology department of the University of Florence ; among 18 doctors and students who attended an autopsy 16 were later attacked within a period of 48 hours.

In the description of the clinical features special stress is laid on the great severity of the headache, the relative bradycardia and the frequent occurrence of troublesome pruritus of the scrotum and perineal region towards the end of the attack or in early convalescence. Physical signs of the pulmonary lesions are said to have been much more often detected than would have been expected from reading the descriptions written by American clinicians. Varying degrees of hilar infiltration were detected by X-ray examination in all the cases with pulmonary localization.

Inapparent attacks, especially in young children, and ambulatory cases were frequent.

Aureomycin in doses of 2·0 gm. daily for 2 to 4 days and chloromycetin in doses of 4·0 to 5·0 gm. daily for the same period have been found valuable.

Preventive vaccines have been found too toxic for general use.

Complement-fixation tests with Lederle commercial antigens were found reliable though in a few cases negative reactions occurred persistently in patients from whom rickettsiae were isolated. The difficulties and pitfalls connected with laboratory investigations are discussed in a helpful manner.

John W. D. Megaw

Del Turco, L. R., Davoli, R. & Signorini, L. F. Febbre Q in una famiglia colonica nella campagna fiorentina. Nota I. [**Q Fever in a Family of Farmers in the Florentine Campagna.**] *Ann. d. San. Pubblica.* Rome. 1951, Jan.–Feb., v. 12, No. 1, 19–30, 2 figs. English summary (4 lines).

Between March 19 and 30, 1950, 8 out of 9 members of a farming family in the Florentine countryside, and two other persons closely associated with them, were attacked with Q fever in circumstances pointing strongly to infection by the inhalation of dust contaminated by the excreta of a flock of 10 sheep. Nine of the sheep gave positive reactions with the complement-fixation test for Q fever ; one sheep reacted at 1–128 and 3 others at 1–32.

John W. D. Megaw

Simondi, U., Davoli, R. & Signorini, L. F. Un episodio di febbre Q a Castello (Firenze). Nota 2. [**An Outbreak of Q Fever at Castello (Florence).**] *Ann. d. San. Pubblica.* Rome. 1951, Jan.–Feb., v. 12, No. 1, 31–6, 1 plan. English summary (7 lines).

In this outbreak of Q fever, 13 persons were attacked between March 22 and May 1, 1950, in a small suburb of Florence about 5 kilometres from the centre of the city. The local distribution of the cases pointed to a flock of four goats as the most likely source of infection ; all the animals reacted with the complement-fixation test for Q fever at titres of 1–16 to 1–128. The only mode of transmission consistent with the known circumstances was inhalation of dust contaminated with the excreta of the goats, which had recently given birth to kids and had habitually traversed the streets in which the patients lived.

John W. D. Megaw

Ridi, U., Signorini, L. F., Davoli, R. & Ceccherini, M. Una epidemia di febbre Q a Brozzi (Firenze). Nota 3. [**An Outbreak of Q Fever at Brozzi (Florence).**] *Ann. d. San. Pubblica.* Rome. 1951, Jan.–Feb., v. 12, No. 1, 37–44, 3 figs. English summary (5 lines).

In this outbreak of Q fever, 15 persons were attacked between early March and early April, 1950, in a suburb of Florence about 7 to 9 kilometres from the city. Eleven of the patients were attacked within a period of five days. The distribution of the cases was sporadic ; all of them occurred in houses close to a road along which large numbers of sheep and goats passed on their way to the slaughterhouse and market of Florence. Transmission was believed to be by inhalation of infected dust.

John W. D. Megaw

Sicuteri, F. La febbre Q a Firenze. Piccolo focolaio epidemico in un quartiere cittadino. Nota 4. [**A Small Epidemic Focus of Q Fever in the City of Florence.**] *Ann. d. San. Pubblica.* Rome. 1951, Jan.–Feb., v. 12, No. 1, 45–53, 1 map. [18 refs.] English summary.

Ten proved cases of Q fever occurred sporadically between March 3 and April 1, 1950, in a small area in the city of Florence. All the homes of the patients were situated on, or near, a main thoroughfare, but there was no

evidence that this was traversed by cattle, sheep or goats, though clandestine passage of the animals by night could not be excluded. The source of infection remained obscure. *John W. D. Megaw*

DAVOLI, R. & SIGNORINI, L. F. Febbre Q in Toscana. Commento a 4 episodi epidemici in provincia di Firenze. Nota 5. [**Q Fever in Tuscany. Comments on the Outbreaks in the Province of Florence.**] *Ann. d. San. Pubblica.* Rome. 1951, Jan.–Feb., v. 12, No. 1, 55–66, 1 fig. [24 refs.] English summary.

This is a critical discussion of the outbreaks referred to in the preceding four abstracts. The author comments on the striking uniformity of the clinical and serological features of the outbreaks, the strictly limited distribution of the cases in time and place, and the complete absence of evidence of transmission from man to man. Alimentary-tract infection was a possibility in only a few of the cases ; direct contact with the animals or their products could be excluded in most.

The conclusion reached is that inhalation of dust contaminated with the infected excreta of sheep or goats is the hypothesis most concordant with the ascertained circumstances.

Complement-fixation tests were carried out in certain groups of persons not suffering from the disease. Among family contacts with patients none was found positive ; among 74 slaughterhouse workers in Florence 15 were positive ; among 6 shepherds 2 were positive ; among 17 laboratory workers 2 were positive (in the laboratory, animal experiments with Q fever rickettsiae were being conducted, but no yolk-sac cultures were made) ; among 75 sera sent for other tests none was positive. *John W. D. Megaw*

DAVOLI, R. & SIGNORINI, L. F. Anticorpi contro *Rickettsia burneti* nel siero di animali da macello in Toscana. Nota 6. [*Rickettsia burneti* **Antibodies in Slaughterhouse Animals in Tuscany.**] *Ann. d. San. Pubblica.* Rome. 1951, Jan.–Feb., v. 12, No. 1, 67–73. English summary (8 lines).

Complement-fixation tests were carried out on 1,052 animals at the public slaughterhouse in Florence during the first four months of 1950.

The chief findings were as follows, in terms of positive reactions with Q fever antigens. Cattle, 6·1 per cent. ; sheep, 32·7 per cent. ; goats, 20·4 per cent. ; pigs, 0·5 per cent. ; and horses, 10·0 per cent.

The percentage of positive reactions among local animals was not significantly different from that of animals coming from the province of Emilia.

A considerable percentage of suckling sheep and goats were positive, 22·4 per cent. against 40·3 per cent. for adults.

The titres appear to have been low in most cases ; among 28 animals in which complete titration was carried out only one reacted at 1–64 and one at 1–32. Among 77 sera found positive after being inactivated at 56°C. only 18·2 per cent. reacted after inactivation at 60°C. *John W. D. Megaw*

BURGDORFER, W. *Ornithodorus moubata* als Testobjekt bei Q-Fieberfällen in der Schweiz. [*Ornithodorus moubata* **as a Test for Q Fever in Switzerland.**] *Acta Tropica.* Basle. 1951, v. 8, No. 1, 44–51, 4 figs. & 6 charts. [11 refs.]

The author describes further work on the diagnosis of Q fever by isolating the rickettsiae from *Ornithodorus moubata* which had fed on patients, experimentally infected guineapigs and mice, and on naturally infected cows [see this *Bulletin*, 1951, v. 48, 542].

He concludes that the method is useful as an auxiliary to the complement-fixation test. He failed to confirm the findings of MEYER who described the occurrence of the rickettsiae in the salivary glands, coxal fluid and "faeces" of infected ticks and also the experimental transmission of infection to mice and guineapigs by the bites of infected ticks [see this *Bulletin*, 1950, v. 47, 619].

[However useful *O. moubata* and other ticks may be in the study of Q fever they are not likely to be much used in diagnosis. It appears that even the foremost experts on the subject had differences of opinion regarding the identity of rickettsia-like bodies seen in the gut smears made from infected ticks, and final proof had to depend on the occurrence of a positive fixation test of the sera of guineapigs inoculated with tick suspensions.

In his summary the author refers to Q fever as "*Queensland-fiebers*"; it should again be pointed out that the Q is an abbreviation of the word query and refers to the questionable nature of the disease when it was first recognized as a new disease.] *John W. D. Megaw*

CALERO, C. Fiebre Q en Panama. Reseña de un caso. [**Q Fever in Panama; Report of a Case.**] *Archivos Hospital Santo Tomas.* 1949, July–Dec., v. 4, Nos. 3/4, 69–82, 1 chart & 4 figs. [22 refs.]

The English summary appended to the paper is as follows :—

"Another case of Q Fever is reported from a laboratory employee, where studies of *R. burneti* were being carried on.

"The diagnosis is briefly discussed and it is compared with the clinical types reported in patients infected in a similar way. The possible methods of infection are compared."

YELLOW FEVER

HERRERA, J. M., ELTON, N. W. & NICOSIA, J. La aparición en Panamá de un brote de Fiebre Amarilla en su forma "Selvática" (1948–1949) descubierto por el examen postmortem. [**Sylvatic Yellow Fever in Panama, 1948–1949, discovered at Autopsy.**] *Archivos Hospital Santo Tomas.* 1949, July–Dec., v. 4, Nos. 3/4, 1–49, 20 figs. [27 refs.]

Five cases are recorded in Pacora, the eastern part of the Province of Panama, and seen in the last months of 1948. Clinically, they were not very characteristic. The first patient was delirious and died the day after admission to hospital; the diagnosis was "malarial encephalitis", although no parasites were found on blood examination. The second case was less obscure; there was some degree of jaundice and death occurred two days after admission. The liver was smaller than normal and pale; the alimentary tract revealed no abnormalities. The third patient complained of fever, headache, chills and diarrhoea and he, too, died two days after admission. At autopsy the liver was seen to be pale and yellowish; again, the gastro-intestinal tract showed nothing abnormal except a little congestion. The fourth had symptoms similar to those of the last, but in addition complained of troublesome vomiting. His liver showed the changes characteristic of yellow fever. The fifth was more typical in that there were petechiae and some digested blood residue in the stomach, and the histological changes in the liver were typical.

In August of the following year two more cases occurred, in men of 22 and 20 years, each dying two days after admission to hospital. The post-mortem findings were typical in both. Ten other persons whose histories indicated

possible attacks of yellow fever in the past were examined by sero-protective tests on mice and 7 of them proved positive. Where a history was obtainable the patients had visited or had been working in the woods of Utive, Tapia, or Quebrada Grande. Photomicrographs show very clearly the pathological changes in the liver in 5, and the kidney in one. *H. Harold Scott*

DICK, G. W. A. **The Neutralization of French Neurotropic Yellow Fever Virus by Sera of Bwamba Children.** *Ann. Trop. Med. & Parasit.* 1950, Dec., v. 44, No. 4, 319–28, 1 map & 1 graph. [15 refs.]

The county of Bwamba in Uganda is in close proximity to forest. In 1941 an epidemic of yellow fever occurred there, and following this the entire population was immunized against yellow fever with the 17D vaccine. When surveys were made 2–3 years later, 90 per cent. of the population had yellow fever antibodies [this *Bulletin*, 1946, v. 43, 34].

In 1946–1947 surveys were made to determine the specific yellow fever antibodies in children born since the end of 1941. It was found that 39·8 per cent. of these young children had specific antibodies, and it is argued that this high level of immunity is evidence that yellow fever infection is continuously being introduced into the human population, presumably from reservoirs in the forest zone.

As 61 per cent. of the monkeys in the forests are immune to yellow fever and 90 per cent. of the human population in Bwamba are also immune it seems likely that there is another as yet undiscovered reservoir of the yellow fever virus. *Forrest Fulton*

ROSS, R. W. **The Survival of Yellow Fever Virus in Refrigerated Mosquitoes.** *Ann. Trop. Med. & Parasit.* 1950, Dec., v. 44, No. 4, 299–308, 1 graph. [10 refs.]

Mosquitoes potentially infected with yellow fever virus have often, for experimental purposes, to be transported considerable distances to a laboratory. It is dangerous that the infected mosquitoes should be fully active, and in addition a considerable mortality may occur. Although yellow fever virus may survive in dead mosquitoes for at least 72 hours at 26°–30°C. [this *Bulletin*, 1946, v. 43, 214], this paper shows that refrigeration to temperatures between 4·4° and 1·1°C. not only immobilizes the mosquitoes, but also that yellow fever virus survives in such mosquitoes for long periods.

Batches of *Aëdes aegypti* were allowed to feed upon monkeys infected with yellow fever virus, and then kept at 30°C. for 14 days. After this preliminary period the mosquitoes were transferred to the refrigerator and groups were removed from time to time and tested for yellow fever virus by intracerebral injection into mice. When the mosquitoes were heavily infected with virus, survival of the virus in a proportion of the mosquitoes could be demonstrated for at least 32 days.

This is a very careful study. *Forrest Fulton*

GALINDO, P., CARPENTER, S. J. & TRAPIDO, H. **Ecological Observations on Forest Mosquitoes of an Endemic Yellow Fever Area in Panama.** *Amer. J. Trop. Med.* 1951, Jan., v. 31, No. 1, 98–137, 5 figs. [17 refs.]

Several human cases of yellow fever of sylvan origin occurred near Pacora east of Panama City, in January, 1949. An enquiry into the mosquito fauna of the area and of the Canal Zone was then initiated ; seven separate stations were established, representing conditions of virgin forest at sea-level, at 400,

1,200 and 2,100 feet above sea-level, in a mangrove swamp, and on a very small and low island covered in secondary scrub. Platforms for adult sampling above ground level were established in trees at heights varying from 20 ft. to 71 ft. Bamboo traps, some open at the top, others closed except for a lateral hole, were attached to the trees near ground level and the platforms. These traps as well as rot-holes in trees, bromeliads, coconut shells, tyres, cans and the like, were examined weekly for larvae.

The mosquitoes taken were : 6 species of *Haemagogus*, 8 of *Aëdes*, 5 of *Psorophora*, 5 of *Taeniorhynchus*, 15 of *Culex*, 2 of *Orthopodomyia*, 1 of *Toxorhynchites*, 5 of *Trichoprosopon*, 15 of *Wyeomyia*, 2 of *Limatus*, 3 of *Sabethes*, *Chagasia bathanus*, and 12 species of *Anopheles*.

The paper records the stations at which the species were taken as larvae or adults, or in both stages and notes those which were taken biting man, their natural breeding places, and those which used the bamboo traps. There are observations on oviposition, hatching records, and the duration of the life-cycle, as observed under laboratory conditions, for some of the species. Seasonal abundance and vertical distribution are noted in some instances. The paper is concerned solely with adult mosquitoes active during daylight hours and observations on nocturnal mosquitoes such as those in the genus *Culex* are on the aquatic stages only.

The host relationship of the mosquitoes to the forest primates and their potential rôles as vectors of yellow fever are not discussed in detail, but it is pointed out that *Sabethes chloropterus* and *S. cyaneus* deserve further investigation. Both bite man and occur in forest from sea-level to 2,100 feet above sea-level. The former is mainly arboreal, the latter indiscriminate in its vertical distribution. These species breed in deep holes in trees, *S. cyaneus* being also particularly attracted to the artificial bamboo traps with lateral openings. Both species were found as adults during the intensely dry season of three months' duration, when no *Haemagogus* or *Aëdes* adults were taken.

D. S. Bertram

LEVÍ CASTILLO, R. Estudio taxonomico sobre los principales vectores de la fiebre amarilla selvatica en America del Sur. I. Terminalias masculinas de los mosquitos Haemagogus. [**Taxonomic Study of the Principal Vectors of Jungle Yellow Fever in South America. Male Terminalia of** *Haemagogus* **Mosquitoes.**] *Rev. Kuba Med. Trop. y Parasit.* 1951, Jan.–Feb., v. 7, Nos. 1/2, 13–16, 16 figs. [15 refs.]

RABIES

MÜLLER, G. Sulla virulenza per via sottocutanea del virus fisso rabico addizionato alla saliva di cane normale. [**On the Virulence of** *virus fixe* **when injected subcutaneously with Normal Saliva of the Dog.**] *Riv. Italiana d'Igiene.* 1950, Mar.–Apr., v. 10, Nos. 3/4, 108–10.

BÉGUIGNON *et al.* of Paris showed in 1949 that a rabies virus which had lost its power to produce the disease if injected subcutaneously was, as it were, re-activated if normal dog's saliva was added to the injection. This they attributed to a spreading factor of the saliva. The author has tested this in the following way. He obtained from the Ancona Anti-rabies Institute a fixed virus which had practically lost its activity when administered subcutaneously. Saliva was obtained from normal dogs injected with pilocarpine. To one lot of 3 guineapigs he administered by injecting under the skin of the flank, to avoid penetrating the muscle, a mixture of equal parts of the fixed

virus, diluted 1 in 10 in physiological saline, and the saliva ; in a second lot of 3 guineapigs he injected the virus and an equal quantity of saliva diluted 1 in 2, and in a third lot the virus with saliva diluted 1 in 3. Prior to injection the mixture was kept at 22°C. for an hour. Four other guineapigs were injected with 1 cc. virus emulsion, as controls.

Lot 1 became paralysed on the 9th day and died by the 12th ; lot 2 were paralysed on the 10th and died on the 13th day ; the third lot and all the controls survived. His results, therefore, confirmed those of Béguignon and his colleagues, that addition of normal saliva of a dog increases the pathogenicity of *virus fixe*. *H. Harold Scott*

D'Silva, C. B. **Studies on Rabies. III. A Note on the Preparation and Storage of a Local 'Standard Challenge Rabies Virus'.** *Indian J. Med. Res.* 1950, Oct., v. 38, No. 4, 489–91.

In the absence of deep-freeze facilities, storage of fixed rabies virus over a period of at least 21 months in 50 per cent. glycerol at 0°C. has been found satisfactory. *C. Klimt*

Donatien, A., Gayot, G. & Poul, J. Inoculation intracarotidienne de virus rabique. [**Intracarotid Inoculation of Rabies Virus.**] *Arch. Inst. Pasteur d'Algérie.* 1951, Mar., v. 29, No. 1, 8–10.

The method was not successful in transmitting rabies (fixed virus) to sheep or in conferring immunity.

Brooks, A. G. **Studies on Rabies. IV. Some Personal Observations.** *Indian J. Med. Res.* 1950, Oct., v. 38, No. 4, 493–7.

This paper contains interesting case histories and notes from this highly experienced author's own observations. Two points may be mentioned in particular : (1) the impossibility of describing typical symptoms of fixed-virus infection in laboratory animals, as, in the author's opinion, they are simply those of progressive weakness which any sick animal may show. (2) The author stresses the very real difficulty encountered by experienced workers in distinguishing Negri bodies from non-specific inclusions. *C. Klimt*

Cornejo, P. M. Historia clinica de un perro rabioso aparentemente sano. [**Clinical History of Rabies in an Apparently Healthy Dog.**] *Rev. Grancolombiana de Zootecnia, Hig. y Med. Vet.* 1950, Jan.–Mar., v. 4, Nos. 1/3, 29–35, 2 figs.

Ahuja, M. L. **Studies on Rabies. II. Antirabies Treatment with Carbolized Vaccine : a Review of Work in India. A Simplified Classification suggested for Purposes of Treatment.** *Indian J. Med. Res.* 1950, Oct., v. 38, No. 4, 483–8.

In India from 1900 to 1907 the original Pasteur method of treatment was in use, from 1908 to 1912 the Högyes method, and thereafter Semple's method with the use of phenol-killed vaccine in varying brain concentrations (0·25 to 5 per cent.) and doses (1 to 10 cc. per day). Treatment and failure figures for the various periods of time are given. Conclusions, however, as the author points out, cannot be drawn, as the reduction in the percentage of failures may be simulated by greatly increased numbers of patients not equally at risk. [Figures given in the beginning of the paper and in the text in Table I do not correspond, which may be due to varying definitions for the total number of patients treated and of patients who died, *e.g.*, failures of treatment.]

Paralytic accidents occurred when living virus vaccines were employed, and again, but in relatively smaller numbers, since the concentration of Semple vaccine was augmented to 5 per cent. The author therefore concludes that living virus is the most important causative factor, although perhaps quantity of nerve tissue injected also plays a part. [It would seem to the reviewer that a reversal of the conclusions would be correct as nervous tissue injected parenterally and not living virus constitutes the common denominator.]

Greater risk of paralytic accidents is considered justifiable because of the better results obtained with the stronger vaccine. [The latter part of this statement however is in contradiction to a preceding one in the same article :—

". . . it will be seen that by increasing brain substance in antirabic vaccine the resulting protection is not necessarily improved".]

The Paris strain of fixed virus has been found to give superior results to the Kasauli strain in preventing rabies in human beings and has in India been generally substituted for the latter [χ^2 calculations from the figures given demonstrate that these conclusions are not warranted statistically].

The author, in the second part of the paper, suggests a simplification of the modified HEMPT classification for determination of the degree of risk, which is in use in India at present. Two categories are proposed : (1) licks and (2) bites (including licks on fresh cuts), and graded treatment schedules are given.

[The author admits that treatment for licks is given mostly for psychological reasons. The reviewer feels that the concept of " all or nothing " should be applied as widely as possible, *e.g.*, persons considered at risk should be given optimal treatment and persons not so considered should not be treated at all. Sub-optimal dosage schedules are to be avoided.] *C. Klimt*

LAMA, A. L'utilità dei vaccini dializzati. [**The Use of Dialysed Vaccines.**] *Riv. Italiana d'Igiene.* 1949, July–Aug., v. 9, Nos. 7/8, 218–25. English summary (4 lines).

The author has for some time been using rabies vaccine and vaccinia (cowpox vaccine) previously treated with formaldehyde to reduce their virulence. The formalin was gradually lessened until he found the greatest dilution of virus which would result in immunity production. Then, in 1948, he tried another method, dialysis, to remove impurities, bacteria, pus cells, corpuscles, etc., and states that the product has proved very satisfactory in producing immunity without the risk of sepsis or " any other complications " of ordinary anti-smallpox vaccination. *H. Harold Scott*

PLAGUE

GARBER, E. D., WOLOCHOW, H. & SMITH, Priscilla. **A Solid Medium for detecting Colonial Variants of** *Pasteurella pestis*. *J. Bacteriology.* 1951, Apr., v. 61, No. 4, 523.

Recently, one of the authors with LEVINE described the use of tetrazolium chloride in tryptose agar medium [TPTZ] for differentiating rough and smooth colonies of *Pasteurella pestis* [this *Bulletin*, 1951, v. 48, 145]. Also in 1946, BRAUN [*Bulletin of Hygiene*, 1946, v. 21, 858] used a transparent medium illuminated by obliquely transmitted light to study dissociation of *Brucella*. The present authors considered the use of a similar medium and technique for the study of colonies of *P. pestis*.

They prepared a medium [TGY] comparable to TPTZ, but superior to it in ease of preparation and keeping properties. This consisted of :—

Tryptone (Difco)	2 per cent.
Glucose	0·2 ,, ,,
Yeast Extract (Difco)	0·8 ,, ,,
Agar	2 ,, ,,

Twenty ml. of medium were poured in a Petri dish and streaked with the inoculum. After 48 hours' incubation at 30°C. the cultures were observed by Braun's method, with the use of a light blue filter.

Smooth colonies were cream white, opaque, with a smooth, glistening convex surface and regular margin. Rough colonies were light blue, translucent, with a rough, furrowed flat surface and irregular margin.

Colonies which could not be placed into either typical class maintained their morphological characters after subculture on TGY. For example a rough colony isolated from a highly virulent smooth stain of *P. pestis* maintained its stability when transferred to TGY and its avirulence was confirmed by inoculation of mice.

Satisfactory differentiation was obtained on TGY medium kept in the refrigerator for 14 days before use. *H. J. O'D. Burke-Gaffney*

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

HALAWANI, A., ABDALLAH, A. & EL-KORDY, M. I. **Amoebiasis in Egypt: Recent Knowledge regarding its Diagnosis, Incidence and Treatment with Aureomycin.** *J. Roy. Egyptian Med. Ass.* 1951, v. 34, No. 2, 97–104. [14 refs.]

The diagnosis of amoebiasis by search for the parasite in stools or bowel scrapings often presents difficulties. A culture medium of hydatid fluid affords a free growth of *Entamoeba histolytica*, and it has the advantage of suppressing *Blastocystis hominis* which in other media is liable to overgrow the amoebae. To 5 or 10 cc. of sterile hydatid fluid in a tube is added a loopful of rice starch; the medium is warmed to 37°C. before insemination with a couple of loopfuls of stool. It is examined for two days while being incubated at 37°C. This medium yields growths from 80 per cent. of infected stools on a single culture, and it has been successfully used in surveys for the detection of carriers of *Entamoeba histolytica* in Egypt. The incidence of *E. histolytica* infection among 400 persons examined ranged from 30 to 80 per cent., and was found to vary with the state of the sanitation of the community studied. In 72 per cent. of these cases the parasites belonged to small cyst-producing races; frank amoebic dysentery is not common in Egypt.

All of 39 patients suffering from relapsing amoebic dysentery, who were treated with aureomycin, immediately responded satisfactorily to the treatment; but of 7 given 2 gm. daily for 7 days, 5 relapsed within 40 days; of 25 given the same daily dose for 10 days, 7 relapsed; and of 7 given 4 gm. daily for 5 days, 3 relapsed parasitically. These figures contrast with relapse rates of 14 of 32 patients treated with emetine parenterally for 10 days; 6 of 10 treated with Wia [Milibis; bismuthoxy-para-N-glycolarsenilate] and Enterovioform; 13 of 15 treated with Wia alone; and 11 of 16 treated with Enterovioform alone. *A. R. D. Adams*

HALL, W. H. **The Treatment of Chronic Human Amebiasis with Aureomycin.** *New England J. of Med.* 1951, Apr. 5, v. 244, No. 14, 495–503, 2 figs. [12 refs.]

Veterans in a hospital in Minneapolis during the first 10 months of 1949 were subjected to three stool examinations for parasites. One such man, with

Entamoeba histolytica forms in his stools, was treated with aureomycin for a *Brucella abortus* infection ; it was noticed that the *E. histolytica* rapidly disappeared and no evidence of it was thereafter seen over a three-month period of observation, 25 stools being examined in this period. It was this which led to a study of the effect of aureomycin on *E. histolytica in vitro* and in the treatment of human amoebiasis.

Two strains of *E. histolytica* maintained in culture on liver-extract agar slants covered with buffered 0·5 per cent. saline solution (*p*H 7·4) and a small amount of rice starch, were exposed to varying concentrations of aureomycin hydrochloride, of emetine hydrochloride, or of chloramphenicol. A concentration of 100 microgm. per ml. of aureomycin in 24 hours regularly immobilized and killed trophozoites, while a concentration of 50 microgm. significantly reduced the numbers of viable amoebae and one of 25 microgm. failed to affect them. Motile bacteria persisted in but slightly reduced numbers in the cultures containing these concentrations of aureomycin, but the bacteria were largely immobilized and reduced in number when the concentration of the drug was greater than 100 microgm. per ml. The surviving bacteria were nearly all *Pseudomonas pyocyanea*, an organism which produces marked changes in the culture medium. To obviate the possible effect of this, sealed glass-slide preparations of amoebae in buffered saline containing varying concentrations of aureomycin were prepared. In control preparations the amoebae and bacteria flourished for at least 24 hours ; in those containing aureomycin in concentrations of 500–5000 microgm. per ml. the amoebae were dead in 5 to 15 minutes, but bacterial motility did not cease for half-an-hour ; in concentrations of 100 microgm. per ml. most of the parasites were dead in 45 minutes, though the bacteria survived 2 hours ; in those of 50 microgm. and 25 microgm. per ml. the motility of both protozoa and bacteria was inhibited in 2½ hours and in 4 hours respectively ; but a concentration of 10 microgm. per ml. took 24 hours to achieve this latter result. *E. coli* and *Endolimax nana* proved more resistant than *E. histolytica* to the action of aureomycin *in vitro*.

Emetine hydrochloride in 1/10,000 dilution killed the amoebae in cultures in 24 hours, but chloramphenicol in concentrations as high as 2,500 microgm. per ml. did not visibly affect the parasites in cultures within 24 hours, and it did not affect the motile bacteria in the same period. With the glass-slide technique, however, chloramphenicol in this concentration killed the bacteria in 2 hours but the amoebae remained motile for more than 3 hours.

Aureomycin was given orally to 20 patients with amoebiasis. Six of these were symptomless carriers of the infection, 10 had chronic amoebic dysentery, and 4 suffered from amoebic hepatitis or liver abscess. All the 6 symptomless carriers were sterilized of their infections by 0·5 gm. aureomycin given every 6 hours for 10 days ; all but 3 of the 10 chronic cases of amoebic dysentery were sterilized by a similar course, but one of these 3 was subsequently rid of his infection by a repetition of the treatment. Of the four patients with amoebic hepatitis or amoebic liver abscess, only one responded to and recovered as a result of the aureomycin treatment ; the other 3 had to be given emetine injections, to which they rapidly responded after the aureomycin had failed to relieve them.

The assessment of cure in the cases of intestinal amoebiasis is based on the clinical findings and on re-examination of stools on 1 to 24 occasions over periods ranging from 1 month to 14 months.

[In the reviewer's opinion " approximately 5·5 stool specimens per patient " examined over " an average of six months after treatment " is an insecure foundation on which to base a percentage of cures of *E. histolytica* infection obtained with a speculative drug. The accurate assessment of the value of a new preparation in the treatment of amoebiasis is of considerable importance,

particularly in view of the extravagant claims which have been made, and are being made, for the formidable range of drugs of diverse constitution employed against this infection.] *A. R. D. Adams*

SIGUIER, F., CHOUBRÁC, PIETTE, M. & SEBAOUN. Quelques résultats, décevants, du traitement de l'amibiase hépatique par l'auréomycine et la chloroquine. [**Deceptive Results in the Treatment of Amoebic Hepatitis by Aureomycin and Chloroquine.**] *Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1951, Nos. 5/6, 217–21.

In assessing the therapeutic effect of drugs on amoebic infections it is necessary to discriminate between their efficacy against the intestinal infection and against extra-intestinal infections. For the latter, emetine is still the sovereign remedy. Combined treatment with emetine and antibiotics, or even treatment with aureomycin alone, affords immediate benefit in most cases of intestinal amoebiasis ; but, in spite of apparently excellent results in some cases, the action of antibiotics in hepatic amoebiasis is uncertain. Seven cases of amoebic hepatitis or of amoebic liver abscess were treated with aureomycin alone ; of these one only appeared to be cleared of this infection by the aureomycin, the other six deriving no material benefit from the treatment. Aureomycin therefore proved inferior to conessine and markedly inferior to emetine in the treatment of hepatic amoebiasis. Various explanations for this lack of effect on the liver infection are considered ; it is suggested that the action of the drug in intestinal amoebiasis is indirect and on the bacterial flora, while in the bacteriologically sterile liver infection this can not apply.

Four patients with amoebic liver infections were treated with the French preparation Nivaquine, which is closely similar to the American Aralen [chloroquine] claimed to be equal or superior to emetine in the treatment of hepatic amoebiasis. None of the four responded satisfactorily to Nivaquine treatment, but all immediately responded to emetine which was given subsequently.

A. R. D. Adams

RADKE, R. A. **Amebiasis with Hepatic Abscess and Pleuropulmonary Involvement.** *U.S. Armed Forces Med. J.* 1951, Mar., v. 2, No. 3, 437–44, 6 figs. [11 refs.]

A male patient aged 36 years, with a history of previous residence in Panama and in Europe, was admitted to hospital acutely ill with evidence of extensive right-sided pulmonary disease, tenderness and enlargement of the liver (4 fingers), enlargement of the spleen (3 fingers) and fever. Penicillin treatment was ineffective and caused toxic reactions. Sigmoidoscopic examination revealed the presence of ulcerative lesions containing *Entamoeba histolytica.* Treatment with quinacrine [mepacrine], 0·1 gm. four times daily for 19 days, produced early symptomatic relief and rapid reduction of normal proportions to the liver and spleen. Treatment with carbarsone and aureomycin was begun when the quinacrine course ended. Two days after completion of the quinacrine course the temperature again rose with evidence of extension of the pleural involvement ; after about a week some blood-stained fluid was aspirated from the right pleural cavity ; it contained no organisms. The following day the patient expectorated yellow matter containing vegetative *E. histolytica* ; this was regarded as evidence of a bronchopleural fistula. Resumption of quinacrine treatment again rapidly relieved the condition and the patient ultimately made a good recovery, being relieved of his infection. It is concluded that the quinacrine played a decisive rôle in controlling and in eradicating the infection, and that the carbarsone and the aureomycin treatment had no effect on the pulmonary lesions. *A. R. D. Adams*

BASNUEVO, J. G. & GUTIÉRREZ ESTARLÍ, E. **Four Cases of Amoebic Liver Abscess cured with Chloroquine.** *Rev. Kuba Med. Trop. y Parasit.* 1951, Jan.–Feb., v. 7, Nos. 1/2, 19–20. [13 refs.]

JELLIFFE, D. B. **Amoebic Hepatitis treated with Chloroquine. (Report of a Successful Case in an African Boy.)** *J. Trop. Med. & Hyg.* 1951, June, v. 54, No. 6, 114–16, 2 figs. [12 refs.]

DUTTA, A. T., GHOSH, B. K. & GUPTA, J. C. **The Seasonal Variation of Alkaloids in different Parts of** *Holarrhena antidysenterica* **Wall. and the Alkaloid Content in the Bark at different Ages. Part I.** *Indian J. Med. Res.* 1950, Oct., v. 38, No. 4, 467–72, 1 graph.

"1. The alkaloid content of different parts of *H. antidysenterica* ('kurchi') during the months of January to December was studied.

"2. The amount of alkaloid present in the bark of plants of varying ages between 5 and 25 years was also studied.

"3. The total alkaloid in bark and root-bark was highest (average 3·80 per cent) in November and December.

"4. The leaves contain maximum amount of the alkaloid in June (1·56 per cent) and it remains over 1 per cent till December.

"5. Flowers and stems do not contain more than 0·58 per cent alkaloid.

"6. Seeds, commonly known as *Indrayaba*, were found to contain on an average 1·82 per cent alkaloid."

DONOSO INFANTE, A., AMENABAR CASTRO, E. & BADINEZ, O. Amebiasis intestinal, peritoneal, hepatica, renal y uterina. [**Intestinal, Peritoneal, Hepatic, Renal and Uterine Amoebiasis.**] *Rev. Med. Chile.* 1950, Dec., v. 78, No. 12, 813–15, 1 fig.

DAMLUJI, S. F. **A Case of Amoebiasis complicated by Perforation of the Bowel, with special reference to the Surgical Aspect of the Disease.** *J. Faculty of Med., Baghdad, Iraq.* 1951, v. 15, Nos. 1/2, 18–24.

CASILE, M. Note sur les abcès du foie en Guyane française. [**Liver Abscess in French Guiana.**] *Bull. Soc. Path. Exot.* 1951, v. 44, Nos. 3/4, 240–48.

Six cases of liver abscess were treated in Cayenne in the years 1945–50 and details are given of age, race and previous dysenteric symptoms, together with the naked-eye appearance of the evacuated pus and the pathological findings thereof. European, Asian and Negro races were represented, and the pus was chocolate colour in three and grey or creamy in the three others.

In only one case were amoebae found, and in another there was a growth of Gram-positive cocci. Antecedent dysentery was noted in four. All cases came to open operation and the conclusion is that microbic and amoebic abscess of the liver are about equally common in the area.

C. C. Chesterman

BRUMPT, L. C. & ANSARI, A. R. Le traitement expérimental de la giardiose. [**Experimental Treatment of Giardiasis.**] *C.R. Soc. Biol.* 1951, Feb., v. 145, Nos. 3/4, 303–4.

In 1937, the senior author showed that quinacrine [mepacrine] was effective in murine giardiasis [this *Bulletin*, 1938, v. 35, 592]. The present authors considered the possibility of other antimalarials having such an effect and made

experiments with different doses of Nivaquine [sulphate of (diethylamino-4′-methyl 1′)-butyl-amino-4-chloro-7-quinoline] in mice infected with cysts of *Giardia muris*. Stools were examined daily. It was noted that untreated control mice showed occasional "negative" periods, during which cysts disappeared for a time. Controls treated with quinacrine (0·1 gm./kgm. orally) showed no cysts after 1 to 3 days but relapses occurred when the drug was discontinued; this is in accord with the experience of those who have treated human giardiasis with quinacrine, since treatment requires to be continued for some time.

The test animals were given Nivaquine by mouth in doses of 0·05 gm., 0·1 gm. and 0·2 gm. per kgm.—the last dose approached the toxic level. Despite 30 days of daily treatment, cysts persisted except for a few "negative periods". Survivors responded to quinacrine in the usual manner.

A dose of 0·05 gm. of Nivaquine subcutaneously proved to be useless and was toxic to the mice: it is pointed out that quinacrine is also ineffective by this route.

It is concluded that Nivaquine, unlike quinacrine, is quite ineffective in the treatment of murine giardiasis. *H. J. O'D. Burke-Gaffney*

KUČERA, K. & JÍRA, J. K případu balantidiové kolitidy. [**A Note on a Case of Balantidial Dysentery.**] *Časopis Lékařů Českých.* Prague. 1951, May 11, v. 90, No. 19, 578–82, 2 figs. [40 refs.] English summary.

The patient was a woodsman aged 53 who lived in a rural district in Czechoslovakia. He had suffered from diarrhoea, weakness and loss of weight for 10 years, which had come on shortly after a sub-total gastrectomy. An intestinal parasite was suspected and he was sent to hospital for investigation. The stools contained undigested food and *Balantidium* was present in large numbers. The patient was put on a milk diet and quinine was given, first as an enema and then by mouth in doses of 0·25 gm. 4 times daily. The parasites were still present after 12 days; emetine was given for 7 days followed by 4 to 6 tablets of Endiaron (dichlorooxyquinoline) daily and 16 tablets of sulphaguanidine for a period of 9 days. On the 29th day of treatment only small numbers of parasites were found; the patient had gained weight, his general condition had improved and he was discharged. He was still well when seen a year later. The parasite may have gained a hold on account of the reduction in gastric acidity caused by the gastrectomy. This point was tested experimentally by exposing suspensions of *Balantidium* from pig faeces to various *p*H values between 2 and 10; death occurred at *p*H 4 in a few minutes. The effect of sulphonamides *in vitro* was also investigated; the parasites survived for 24 hours in relatively high concentrations (1/40) of sodium sulphathiazole and sodium acetylsulphonamide. *D. J. Bauer*

RELAPSING FEVER AND OTHER SPIROCHAETOSES

EGIDIO, L. Osservazioni sulla epidemiologia della febbre ricorrente in Somalia. [**Observations on the Epidemiology of Relapsing Fever in Somaliland.**] *Arch. Ital. Sci. Med. Trop. e Parassit.* 1951, Feb., v. 32, No. 2, 105–17. [19 refs.]

Egidio has been medical officer for many years to a plantation in Somaliland and has been in charge of a hospital in Villaggio Duca degli Abruzzi—the plantation village settlement. Sixteen kilometres away, the plantation had at

one time built its cattle station with quarters for its veterinary officer and its stockman, both Italian, and for its native staff. This station was used by the military authorities for hundreds of mules imported from Italy in 1935 [presumably in connexion with the Abyssinian war]. The Italian officers lived in the European quarters and some hundreds of African soldiers were accommodated in the native buildings. In the last months of 1935, many of these soldiers were becoming sick with what their army medical officer, who lacked a microscope, thought to be malaria. The cases proved resistant to quinine treatment and the advice of the plantation medical officer, who had some laboratory facilities, was sought. There was revealed a history of tick bites especially by night, and *Trep. duttoni* was demonstrated in the patients' blood. The cases were successfully treated with arsphenamine. Specimens of *Ornithodorus moubata* were collected from the earthen floor of the huts. In daytime the mules were tethered in the shade of trees and *O. savignyi* were found on this ground and in the sand adjoining the wells. Generally speaking, the soldiers complained of tick bites while in the huts, rarely when outside. Such control measures as were then available against tick infestation were applied and the outbreak came to an end within about three months, after 76 cases had been confirmed.

In May 1948, cases of relapsing fever were again diagnosed in, and confirmed by examination of blood from, patients attending the plantation hospital. A search in the patients' homes failed to discover any ticks. All the village houses had been treated with Gammexane or DDT against mosquitoes within a month or so. It was noticed that, in every case of relapsing fever, the subject wore the badge of a local political association and it was then revealed that this political group often met in their party building, which had escaped insecticide treatment ; the earthen floors were found infested with ticks and the epidemic was soon controlled by treating the building with Gammexane—a 7·5 per cent. suspension in water being sprayed on the walls and the powder being sprinkled on the floors. Altogether 68 cases were demonstrated in this outbreak.

The paper discusses the possible identity of the two *Treponemata—duttoni* and *recurrentis*—and suggests the respective rôles of their two insect hosts—tick and louse. It is suggested that *O. savignyi*, which infests open ground, may be connected with sporadic cases, while *O. moubata*, which lives inside habitations, is usually responsible for epidemic outbreaks.

For insecticide control, walls should be sprayed with a water suspension of 7·5 per cent. Gammexane P.520 in the dose of 5 litres for every 100 square metres of surface. *J. Cauchi*

Durieux, C. & Boiron, H. La souris peut être infectée par le spirochète récurrent. [**Infectibility of the Mouse by** *Trep. recurrentis*.] *Bull. Méd. de l'Afrique Occidentale Française*. 1950, v. 7, No. 2, 115–16.

Kalra, S. L., Jacob, V. P. & Rao, K. N. A. **Effect of DDT and BHC on** *Ornithodorus* **Ticks. Part I.** *Indian J. Med. Res.* 1950, Oct., v. 38, No. 4, 457–66, 1 diagram.

The incidence of tick-borne relapsing fever among service personnel in Kashmir stimulated the laboratory and field experiments described to ascertain the effects of DDT, *gamma* BHC and pyrethrin in the control of the vector, *Ornithodorus crossi*. This was abundant in the floor dust, and behind the mud plaster of dwellings. In the laboratory, ticks were released on to the insecticidal dusts and on to sprayed mud surfaces for periods of 10 minutes. The dust

forms of DDT (5 per cent.) and Gammexane D 929 (13 per cent. *gamma* BHC) were found to be effective for about three weeks, with the use of 400 mgm. per sq. ft. of the former and 50 mgm. per sq. ft. of the latter, which was faster in its action. On mud surfaces, both DDT and Gammexane L.G. 140 solutions in kerosene (at 10 per cent. DDT and 1 per cent. *gamma* BHC), lost their effects rapidly. DDT emulsion also had a poor effect. *Gamma* BHC water suspensions, Gammexane P 735 and P 520 were fairly effective at 5 to 10 mgm. *gamma* BHC per sq. ft., 50 per cent. of ticks surviving when exposed to the surface three days after treatment. A 0·1 per cent. pyrethrin solution both as spray and atomized mist had no effect. Both pyrethrin and Gammexane enhanced the effect of DDT, 1,000 mgm. of the former, and 100 mgm. of Gammexane D 929 giving 100 per cent. kill after 9 and 5 days respectively. Pyrethrin added to Gammexane did not increase the effect. In the field, the mud walls of an infested hut were sprayed with a 10 per cent. kerosene solution of DDT at 200 mgm. per sq. ft. and the floor dusted with a 5 per cent. DDT dust mixture at 400 mgm. per sq. ft. This gave good control after 4 days but reinfestation had taken place after twenty-seven days. A concrete hut, dusted with the same mixture, was completely cleared after four days. The floors of two rooms, dusted with 50 mgm. and 100 mgm. of Gammexane D 929 per sq. ft., were almost cleared, but after two months were as heavily infested as before.

Ruth Nash

HUDEMANN, H. & MÜCKE, D. Zur Penicillin-Therapie des Sodoku. [**Penicillin Therapy of Ratbite Fever.**] *Ztschr. f. Hyg. u. Infektionskr.* 1951, v. 132, No. 3, 292–9, 1 fig. [30 refs.]

As it is difficult to grow the *Spirillum minus in vitro* the authors used experimental animals. White mice and guineapigs were inoculated with blood from a patient and the time of disappearance of the spirillum from all the organs was ascertained after a particular dose of penicillin was administered. Blood, spleen, liver, kidney and brain emulsions from the inoculated animals were administered by injection to other animals which were kept under observation for some time and their blood frequently examined microscopically for the organism.

Disappearance of the spirillum from the peripheral blood is not a satisfactory criterion of cure. Isolated organisms which may have survived treatment can be detected only by sub-inoculation of blood and tissue emulsions into other animals.

Guineapigs are 100 to 1,000 times more sensitive to penicillin than white mice. This toxicity of penicillin, hitherto only found in guineapigs, is due to destruction of the normal Gram-positive intestinal organisms by the penicillin.

Estimation of the blood concentration of penicillin in the experimental animals showed that doses which cured ratbite fever in 24 hours gave a concentration of 0·05 unit per cc. three hours after the injection in a guineapig but far below that value in white mice.

Experimental results in animals, especially the results of therapeutic dosage, cannot be transferred to man but consideration of the blood level of penicillin is useful. The authors' experiments indicate that if a level of 0·05 unit of penicillin per cc. of blood is maintained for 24 hours a cure is assured in that time. This requires a dose in the human being of 500,000 to 600,000 units for one day.

P. A. Clearkin

LEPROSY

CORDERO SOROA, A. El momento actual de la lucha contra la lepra en España. [**The Present Position of the Anti-Leprosy Campaign in Spain.**] *Rev. Sanidad e Hig. Pública.* Madrid. 1950, July–Aug., v. 24, Nos. 7/8, 490–517, 2 figs.

This is a review of much importance and interest of the campagin against leprosy, past and present, in Spain. The first leprosarium was founded in Barcelona in the 11th century, but others say that the Cid was the first to establish a refuge in 1067 after he had sheltered a cripple for the night and received his blessing. At the beginning of the 20th century the whole problem of leprosy was ignored, and the only means of combating it were a few old buildings insufficient to hold all the sufferers that sought admission. Up to 1917 few active steps were taken. In 1923 the total of cases in Spain was calculated at 1,500, and in 1924, after a census of all the provinces, at 2,000. But in 1934, Peyri drew attention to the anomaly that in the last census there were only 35 cases recorded in Catalonia, while there were actually 200 known cases. In 1946 an epidemiological map was published giving the number as 1,575, but the present author was able to trace errors in this.

The present campaign of the National Health Council against leprosy is discussed under 8 headings : (1) Survey, including the examination of contacts. The present known cases are detailed in a comprehensive table showing the number in each of the 52 provinces under sex, age, state (married or single), vocation, place of isolation (if isolated), and type of disease. Of the total of 1,879 persons found with leprosy, 1,062 are males. The age rate is remarkable, as only about 27 per cent. are of ages 0 to 30. [On page 71 of *Leprosy*, ROGERS and MUIR, the percentages of patients with date of onset from 0 to 30 years of age in 6 widely distributed countries vary between 72·50 and 93·70. The Spanish figures may mean either that many affected children have not yet been contacted, or that there is a strong recent tendency for the disease to die out.] Also the type rate should be noted, as 732 out of 1,013 classified cases (about 72 per cent.) were lepromatous. [In India and most parts of Africa it is usually round about 20 to 25 per cent.] The highest incidence (0·38 per mil) is in the province of Jaén and other provinces in the south. Of the total, 37·3 per cent. are interned in colonies (656 cases), and provincial hospitals (43 cases), and 33 per cent. (610 cases) in their homes. (2) Speeding up the construction of 3 new colony-sanatoria at Trillo on the Tagus River, at Toen in the province of Orense in the north-west, and on the Island of Tenerife. (3) Preventoria for children, one of which is already functioning in Madrid and 2 more are projected for Valencia and Málaga. (4) Treatment. So far Promin and Diasone have been difficult to obtain in sufficient quantity, but it is hoped that it will soon be possible to prepare sufficient quantities of sulphones in the country. (5) Short courses on leprosy for doctors which are held at the colony-sanatorium at Fontilles under the direction of Dr. Contreras Dueñas. (6) Mobile Units. During 1949 with the first 4 of these units 3,000 contacts of 710 patients were examined, with the result that 279 new cases were found. (7) A welfare organization for patients and their dependents. (8) Propaganda for education of the public by means of pamphlets, radio, etc.

The author ends with the hope that by the time the International Leprosy Congress is held in Madrid in 1953 it will be appreciated that with the enthusiastic and constant help of the authorities, combined with the able and intelligent direction of the sanitarians, they may aspire to stamp out the phantom of leprosy at no distant date. *Ernest Muir*

YBARRA PEREZ, R. & GONZALEZ PRENDES, M. A. Distribución geografica de la lepra en la Provincia de las Villas. [**Geographical Distribution of Leprosy in the Province of Las Villas.**] *Rev. Sifilografia, Leprologia y Dermatologia.* Marianao, Cuba. 1951, Jan., Feb., Mar. & Apr., v. 7, No. 1, 16–20.

This province, with a population of 938,581 and a density of about 43·83 inhabitants for each two kilometres, is situated in the central region of Cuba. The territory is moutainous up to 3,000 metres in height, but is rich and fertile, and has a rainfall of between 946·5 mm. on the coast and 1,483 mm. in the interior. There are 635 known cases of leprosy ; 88 of these persons are under hospital conditions. This makes 5·82 patients to 10,000 of the inhabitants. The distribution is not homogeneous but varies from 20·8 to 0·5 per 10,000 in the various municipal areas.

The climatic and other conditions of the province are fully recorded, but their relationship to the frequency of leprosy is not discussed. It is hoped to co-ordinate and compare all the data once a complete survey of the island has been finished. *Ernest Muir*

GONZALEZ PRENDES, M. A. & YBARRA PEREZ, R. Estado actual de los enfermos de lepra, Provincia de Las Villas. [**Details concerning Patients with Leprosy in the Province of Las Villas.**] *Rev. Sifilografia, Leprologia y Dermatologia.* Marianao, Cuba. 1951, Jan., Feb., Mar. & Apr., v. 7, No. 1, 29–34.

This is in continuation of the previous article and gives the particulars of age, race, sex, occupation, nationality, standard of living, type of disease, contacts and treatment. Regarding race (or rather colour) 83·36 per cent. are given as white, 7·13 as black, 8·04 as mixed, and 0·19 per cent. as yellow ; 7 cases are unclassified. Under the heading of occupation, 52·10 per cent. are shown to be farmers, domestic servants and day-labourers, while 4·57 per cent. are school children and students. There are 26 Spaniards, compared with 507 Cubans, but the number of Spaniards seems to have increased since the last census in 1943. The lepromatous cases form 58·23 per cent. of the whole and tuberculoids only 14·07. [This in marked contrast to the findings in India and Africa where lepromatous cases are 20 to 25 per cent.] More than 60 per cent. of those having the lepromatous form live in close contact with healthy people. Of the whole, 68·74 per cent. are under treatment. The author considers that there is reason for encouragement and hope, because of the regular attendance of patients at the Santa Clara dispensary, many coming from long distances, and also because of the good clinical results that are being obtained with modern treatment. *Ernest Muir*

RIO LEON, E. Tratamiento de la lepra por las sulfonas en el Dispensario PSLEC de Santa Clara. [**Treatment of Leprosy with the Sulphones in the PSLEC Dispensary at Santa Clara.**] *Rev. Sifilografia, Leprologia y Dermatologia.* Marianao Cuba. 1951, Jan., Feb., Mar. & Apr., v. 7, No. 1, 53–68.

The initials indicate the Skin-Syphilis-Leprosy External Clinic, and Santa Clara is the principal town in the province of Las Villas in Cuba. The article is one of a series dealing with leprosy in this region, two of which are abstracted above. A report is given of 127 cases treated for periods of 6 months to 3½ years first with Promin and most of the time with Diasone or Diamidin. There was clinical improvement in 94 per cent. of those who had been treated for 2 years or more, and much clinical improvement in 63 per cent. There was bacteriological improvement in 40 per cent. and 4·5 per cent. became entirely negative. Of the 127 patients, all of whom attended the out-patient clinic for

treatment, 91 attended regularly, 23 with slight interruptions, and 13 with long interruptions sometimes for months. The cases are classified as 95 lepromatous, 12 tuberculoid and 20 uncharacteristic. *Ernest Muir*

TISSEUIL, J. De l'allergie et de l'anergie dans la lèpre humaine. [**Allergy and Anergy in Human Leprosy.**] *Rev. Coloniale de Méd. et Chir.* 1951, Apr. 15, v. 23, No. 189, 86–8.

ARGÜELLO PITT, L. & ALBERTO CONSIGLI, C. Estudio comparativo de lepromino reacciones efectuadas con antigeno bacilar común y con antigeno visceral cadavérico en enfermos de lepra. [**A Comparative Study of Lepromin Reactions produced with the Ordinary Bacillary Antigen and with Antigen derived from the Viscera of Cadavers.**] *Rev. " Fontilles ".* Valencia. 1950, July, v. 2, No. 6, 516–19, 2 figs. on pl.

This trial was made so as to check the reaction of Fernandez which gave a 50 per cent. discrepancy. The authors obtained a coincidence of 90 per cent. with the Mitsuda reaction, though the results with the cadaver antigen were on the whole weaker. They consider that this might have been due to there being fewer bacilli in the cadaver antigen. *Ernest Muir*

ARGÜELLO PITT, L. & ALBERTO CONSIGLI, C. Manifestaciones iniciales de la lepra observadas en convivientes. [**Initial Lesions of Leprosy seen in Contacts.**] *Rev. " Fontilles ".* Valencia. 1951, Jan., v. 2, No. 7, 556–62.

The authors describe a study of the first-noticed leprous lesions in contacts of leprous patients attending the skin clinic of the *Patronato de Leprosos* in Cordoba (Argentine). The contacts examined were 596, of whom 67 were diagnosed as leprous cases and 11 others were classed as suspects. Of the 67 cases 41 were selected as having definite initial lesions [by this term is apparently meant " first found lesions "]. In 80 per cent. of these there were changes in sensation and, with the exception of 2 cases, these were initial macules. Histological examinations were interesting as they made it possible to prognose in many cases the type which was evolving before the clinical examination made that possible. Many patients were surprised when told that they had macules which had to be studied to find out their true nature. In 8 cases, 2 of which were reacting tuberculoids, bacilli were present. The majority of lesions were 2 to 3 centimetres in diameter and were chiefly on the thighs, arms and buttocks. In 80 per cent. the bacteriological examination was negative. Full particulars of each case are given in tabular form. *Ernest Muir*

MIRÓ CARBONELL, J. Lepra lepromatosa, sintomatologia clínica y evolución. [**Clinical Symptomatology and Evolution of Lepromatous Leprosy.**] *Rev. " Fontilles ".* Valencia. 1950, July, v. 2, No. 6, 457–72, 10 figs. on 5 pls.

This is an excellent and up-to-date review of the subject, which should be useful for those especially who are taking part in the campaign against leprosy in Spain. *Ernest Muir*

SANDALIO MIGUEL, D. Lepra visceral. [**Visceral Leprosy.**] *Rev. " Fontilles ".* Valencia. 1951, Jan., v. 2, No. 7, 525–30.

The author, as the result of his own observations, gives a very clear view of the clinical and pathological pictures in leprosy, which is worthy of detailed study. Particularly interesting is his suggestion that anaemia, so common in leprosy, may be largely due to hypoplasia or aplasia in the bone marrow which

is the seat of leprous infection. He also finds that the frequent gastro-intestinal disorders in leprosy are due to disease not in the bowel but in the liver. He considers that the state of hypotension and asthenia common in many cases of leprosy may be due to infiltration of the adrenals, especially the cortex, with amyloid material. More thorough study of the internal organs in leprosy is recommended, so as to increase our knowledge of the disease and at the same time understand the indications and contraindications of modern anti-leprosy chemotherapy. *Ernest Muir*

MADRAMANY, P. Lepra nasal. Su importancia en el diagnostico precoz y en la clasificación de la enfermedad. Lesiones faringeas. Lesiones laringeas. Tratamiento especial de estas manifestaciones. [**The Importance of Leprosy of the Nose in the Early Diagnosis and Classification of the Disease ; Pharyngeal and Laryngeal Lesions ; the Special Treatment of these Conditions.**] *Rev. " Fontilles "*. Valencia. 1950, July, v. 2, No. 6, 473–81, 4 figs. on 2 pls.

This review covers briefly the literature of the subject, but contains little that is new. The effect of sulphones on the upper respiratory passages is stressed, and the fact that the sulphones, if given in time, prevent the deformities of the nose and throat which were once so common and so difficult to treat effectively. *Ernest Muir*

TOMÁS APARISI, D. Lepra ocular. [**Leprosy of the Eyes.**] *Rev. " Fontilles "*. Valencia. 1950, July, v. 2, No. 6, 482–90.

The author from an extensive experience of the subject discusses leprosy of the eyes in its various aspects. He reports the frequency of keratitis in patients under treatment at Fontilles. In the five years from 1944 to 1948 the percentages were respectively 32, 50, 60, 43, and 47·8, but he remarks that the frequency depends upon how advanced the average case is on admission. He has not been able to confirm the observations of some Japanese workers who record a relatively high proportion of cases with leprous retinitis, or of ELLIOT who described nodules on the retina similar to those on the iris. The path of infection of the eye is discussed at some length, as to whether it is infected through the blood stream or the infection spreads from the eyelids. The author tends to favour the former of these hypotheses. *Ernest Muir*

MARTÍNEZ DOMÍNGUEZ, V. Quimioterapia de la lepra lepromatosa. [**Chemotherapy of Lepromatous Leprosy.**] *Rev. " Fontilles "*. Valencia. 1950, July, v. 2, No. 6, 491–515, 3 pls.

Seventy-one cases of lepromatous leprosy were treated with Diasone. Of these, 69 showed clinical improvement in six months. There was bacteriological improvement in 78·8 per cent. including 49·3 per cent. which became bacteriologically negative. There were the following changes in the reaction to lepromin test :—

Change from negative to strongly positive...	2 cases
Change from negative to positive	11 ,,
Change from negative to weakly positive	9 ,,
Change from weakly positive to strongly positive ...	2 ,,
Change from weakly positive to positive	1 ,,
Negatives with no change	40 ,,
Weakly positive with no change	2 ,,
Frankly positive with no change	2 ,,
Change from weakly positive to negative	2 ,,

[These lepromin results are very unusual and do not at all correspond with the findings of other workers. Also that 49·3 per cent. should become negative

bacteriologically within six months is without precedent. These findings require confirmation, and, if proved correct, the cause of improvements so much more favourable than those elsewhere would be worthy of careful study.]

Ernest Muir

GRAMBERG, K. P. C. A. **The Non-Specific Treatment of Leprosy.** *Documenta Neerlandica et Indonesica de Morbis Tropicis.* Amsterdam. 1951, Mar., v. 3, No. 1, 75–82.

The author, from his 21 years' experience as medical superintendent of the leprosy colony at Donorodjo, Java, describes diet, local and surgical treatment and the treatment of reaction, and of lesions of the eyes and nose. He considers vitamin B_1 unnecessary, as the nerve disorders of leprosy are of a different nature from those of beriberi, but recommends vitamins A and B_2 complex. He comments on the feeling of fatigue and weakness often associated with leprosy ; apart from anaemia and incipient muscular atrophy he considers that there is often a psychological factor in this : " If the patient has faith in his physician or in a new drug—he will take on a new lease of life ". The ordinary forms of local treatment with CO_2 snow, trichloracetic acid, &c. are recommended, and the ordinary surgical operations for decapsulation of tender and swollen nerves, and for removal of necrosed bone, are described. The usual treatments for complicating lepra reaction, inflammation of the eyes and rhinitis are explained. [It is remarkable that in a paper written in 1950 no mention is made of the sulphones or of their striking effects in clearing up these complications and dendering unnecessary to a large extent much of the local treatment he has rescribed.]

Ernest Muir

FÉLIX CONTRERAS, D. **Pronóstico.** *Rev. " Fontilles ".* Valencia. 1951, Jan., v. 2, No. 7, 531–40.

This is a review of leprosy from the time when it was regarded as incurable to the present day when under new forms of treatment large numbers of patients recover. The various prognostic features : type, duration, age, sex, immunity and histological examination are fully discussed.

Ernest Muir

HELMINTHIASIS

PASCALE, H. Censo de verminose no interior do Estado de São Paulo em 1947. 1ª Comunicação. [**Helminthiasis in the State of São Paulo in 1947.**] *Arquivos de Hig. e Saúde Pública.* S. Paulo. 1950, Mar., v. 15, No. 43, 3–14. English summary.

This investigation was carried out in March, 1947, and comprised samples from 120 municipalities, urban and rural. In urban municipalities 200 faecal specimens were examined—two smears of each, one in watery suspension and one in saline—and in rural municipalities 800. " These figures were adhered to regardless of the actual population numbers of the respective municipalities." The returns are entered merely as positive or negative, not the species found, so we can only deduce the existence of helminthiasis of some kind.

Altogether 117,505 specimens were examined [this would give an average of just over 979 specimens for each of the 120 municipalities, whereas, as stated, 800 were examined in each rural and only 200 in each urban municipality]. of these, 90,437 (76·9 per cent.) were positive ; of 26,039 in urban zones 17,048 (65·5 per cent.) and of 91,466 in rural zones 73,359 (80·1 per cent.) were positive.

These figures are then analysed in various ways, such as the degree of infestation among those who usually went about barefoot and those who habitually wore shoes ; among those with privies and those without [the method of disposal of excreta of those without privies is not stated] ; among those who habitually ate raw fruits and salads ; among those who used filtered water ; also according to sex, and nationality. Most of these questions are mainly of local interest and, as the author states, the investigation is not yet finished. *H. Harold Scott*

TORRICO, R. A. Parasitosis intestinales. [**Intestinal Parasitism.**] *An. Laboratorio Central.* Cochabamba, Bolivia. 1951, Jan., v. 3, 20–23.

The following is a translation of the author's summary :—

The author reports the examination of 5,499 specimens of faeces from persons attending the hospitals and dispensaries in the city of Cochabamba [Bolivia]. It was found that 67·1 per cent. harboured parasites and 49·5 per cent. harboured pathogenic parasites. *H. J. O'D. Burke-Gaffney*

DEANE, Maria P. Helmintos eliminados por um grupo de residentes da Amazônia, após um tratamento pelo Hexilresorcinol. [**Helminths expelled by Residents in Amazonia after Treatment with Hexylresorcinol.**] *Rev. Serviço Especial de Saúde Pública.* Rio de Janeiro. 1950, Jan., v. 3, No. 2, 443–64, 4 figs. English summary.

This investigation was undertaken because some practitioners had reported unsatisfactory results from the use of hexylresorcinol as an anthelmintic. Faecal samples were obtained from 583 persons in 7 towns [the author says 5 but the following are mentioned : Belém 221, Cametá 13, Santarém 112, in Pará State ; Porto Velho 93 and Guajará-Mirim 22, in Guaporé Federal Territory ; Manáus 111 and Itacoatiára 11, in Amazonas State]. The stools were examined by the direct method and by Faust's concentration method and the drug was given " in the doses recommended " [not stated more definitely], and followed by a dose of 15–30 gm. of magnesium sulphate 24 hours later. The worms passed during the ensuing 48 hours were counted and classified. Examination was repeated after a week. *Ascaris*, *Trichuris*, *Enterobius* and hookworms are the only worms referred to. Of the total 583, 250 (42·8 per cent.) were children between 10 and 14 years of age. Of those whose faeces contained ova of *Ascaris lumbricoides* 77·2 per cent. passed the worms within 48 hours and the percentage of cure was 42·6. Of those with hookworm ova 76·9 per cent. passed ankylostomes and 41·2 per cent. were cured. It is worth noting that infestation by *Necator americanus* was between 3 and 4 times as common as that by *Ancylostoma duodenale*, but the relative proportions of the worms removed was almost 50 to one, which is interpreted as implying that the drug is more efficient against *Necator* than against *Ancylostoma*. *A. caninum* was found once and *A. brasiliense* in 6 cases.

Trichuris trichiura was passed within 48 hours by only 16·8 per cent. of those whose faeces had been positive for ova, but 36·9 per cent. became negative later, indicating delayed action. More than half (53·3 per cent.) were infested with *Enterobius vermicularis* and this was especially rife among pupils in a Belém school where 79 per cent. of the resident students were infested. The above facts are presented in a series of tables also, and the paper is illustrated by photographs of the buccal capsules of the different ankylostomes.

H. Harold Scott

D'IGNAZIO, C. Terapia indigena di alcune elmintiasi in Etiopia. [**The Indigenous Treatment of certain Worm Infestations in Ethiopia.**] *Arch. Ital. Sci. Med. Trop. e Parassit.* 1951, Feb., v. 32, No. 2, 158–62. English summary (3 lines).

Notes—botanical names, short description, mode of preparation and use—are given on anthelminthics used by the African population of Ethiopia, who recognize only the tapeworm, the roundworm and the threadworm and believe them to have serious pathogenetic qualities. This applies to the hill tribes; the inhabitants of the more low-lying regions are seldom infested and show less knowledge in the matter of medicinal plants.

The remedies dealt with include :—

(1) The bark of *Albizzia anthelmintica* Bongar; (2) *Allium sativum* L. (garlic); (3) the seeds of *Phitolacca dodecandra* l'Hec; (4) tobacco leaves *Nicotina rustica* L.; (5) the fresh seeds of *Vicia faba* L.; (6) the latex from the green fruit, and the seeds, of *Carica papaia* L.; and (7) all cooked fruit, seeds, flowers and leaves of *Prunus pepica* L. Investigations into the pharmacology of some plants are being continued. [For a further note on remedies against tapeworm see D'IGNAZIO, p. 821.] *J. Cauchi*

CAMAIN, R., NAVARRANNE, P. & AYITE, E. Deux cas d'annexite à *S. haematobium* observés à Dakar. [**Two Cases of** *Schistosoma haematobium* **Infection of the Uterine Appendages at Dakar.**] *Bull. Soc. Path. Exot.* 1951, v. 44, Nos. 3/4, 202–8, 8 figs. on 6 pls.

After reference to some of the literature on schistosomal involvement of the female genitalia the authors report two cases of such infection due to *Schistosoma haematobium*. In the case of the first patient, an adult multipara the complaint was of metrorrhagia and menstrual irregularity; there was no history of dysuria or of haematuria. Examination suggested uterine fibromata and a chronic inflammatory lesion of the left appendage. At operation the uterus was greatly enlarged and hard, and bore several superficial fibromatous nodules; the left Fallopian tube was swollen, inflamed and hyperaemic, and the left ovary was enlarged, cystic and sclerotic. Schistosome ova were recovered from the appendage but not from the uterus. A subtotal hysterectomy was done; subsequent examination of the stools and urine yielded no schistosome eggs.

The second patient, a girl of 13 years, was admitted for repair of a right inguinal hernia; she gave no history of urinary or of gynaecological troubles. On examination there was a reducible and painless right inguinal swelling the size of a tangerine. At operation the right Fallopian tube and the ovary were found to be inflamed; these were removed and the hernia was repaired. Here again schistosome ova were found on section of various portions of the appendage, but none was recovered on subsequent search of the urine.

The symptomatology of schistosomiasis of the uterine appendages is considered, and the detailed histopathology of the lesions is described. Adult schistosomes were seen in venules in the Fallopian tube of the second patient; these caused a panphlebitis of the vessels containing them, an observation in contrast to the accepted view that the worms do not cause any vascular lesions. The local reaction to the presence of the ova accorded with the accepted descriptions. *A. R. D. Adams*

DE BIE, P. & DELVILLE, J. P. Cancer et bilharziose hépatiques au Katanga: Note préliminaire à propos de quelques cas. [**Hepatic Schistosomiasis and Cancer in Katanga, with Notes on some Cases.**] *Ann. Soc. Belge de Med. Trop.* 1950, Dec. 31, v. 30, No. 6, 1423–51, 8 figs. on 4 pls. [15 refs.]

Helminth infestations, particularly schistosomiasis, have long been suspected of being among the aetiological factors in primary cancer of the liver as well as in hepatic cirrhosis. The authors give a brief résumé of the literature dealing with this problem and quote several series of statistics. The most important are those quoted by AFIFI [this *Bulletin*, 1948, v. 45, 718] which include a series of 880 autopsies: hepatic schistosomiasis with cirrhosis but without cancer was found in 160, and non-schistosomal cirrhosis in 20, of which one showed a primary hepatic cancer. The same author quotes a series of 20,280 biopsies and autopsies among which 24 per cent. of all cancers were associated with schistosomiasis; 85 per cent. of cancers of the bladder were so associated, as were 66·6 per cent. of cancers of the prostate, 12·5–16·6 per cent. of cancers of the colon and rectum, and 19·25 per cent. of cancers of the vulva and vagina; for all other regions the percentage in which this association was found was 3–6. [The total number of cancer biopsies in this series is not given separately.]

The present paper is a detailed study of the autopsy and laboratory findings in 5 cases of primary cancer of the liver, admitted to hospital with large tumours of the liver: a history of treatment for schistosomiasis was present in 4 of them. Ova of *Schistosoma mansoni* were found in the stools of 4 patients. The livers of all five showed carcinomata macroscopically and microscopically; 3 of the tumours were of the hepato-cellular type and 2 of the cholangio-cellular type. All 5 livers showed periportal cirrhosis of Laënnec. Ova of *Schistosoma* or schistosomal follicles or both were found in 4 and in one case also adult worms, male and female, were found in a periportal vein.

To contrast with these findings the authors describe the livers of 4 other cases in which there were great numbers of ova of *Schistosoma* in follicles, some recent and surrounded by phagocytic cells, some old and fibrosed; various types of hepatic degeneration, granular and fatty, were present but no cirrhosis, in spite of massive infestation of as long standing as in the cancer patients. In the authors' opinion their findings confirm GELFAND's view [this *Bulletin*, 1950, v. 47, 903] that the lesion of hepatic schistosomiasis is very localized and well tolerated by the liver cells, even in the immediate neighbourhood of adult worms and ova; but a certain amount of sclerosis, not accompanied by hyperplasia of bile ducts, takes place in the periportal tissues when the ova are abundant. This is not a true cirrhosis, though it may cause the same symptoms. The authors consider that hepatic schistosomiasis is not related causally to periportal cirrhosis, whereas primary hepatic cancer is so related. They call attention to the fact that primary cancer of the liver is rare in the indigenous population of Katanga, whereas *Schistosoma mansoni* infestation is very common. There is experimental evidence that cancer of the liver in rats produced by butter yellow [paradimethylaminoazobenzol] and its derivatives is always preceded by cirrhosis.

The paper is illustrated with eight excellent photomicrographs.

W. L. Harnett

SOUZA LIMA, J. S. Considerações em torno da infestação esquistossomotica em ubá e adjacências. [**Considerations concerning the Infections with Schistosomiasis in Ubá and Environment.**] *Rev. Brasileira Med.* Rio de Janeiro. 1951, Apr., v. 8, No. 4, 244–9. English summary (9 lines).

Schistosomiasis mansoni, says the author, is a veritable scourge in the Brazilian hinterland. He undertook a special investigation in Ubá, and a

study of the records at the Health Centre there from September, 1946, to June, 1950, showed that of 1,505 specimens of faeces, examined fresh and " without any process of enrichment ", 1,310 contained some parasite and 18 of them (1·37 per cent.) were *S. mansoni* [18 cases in three and three-quarter years is hardly a " scourge "]. There were 502 (38·3) with hookworms [no distinction was made between *Necator* and *Ancylostoma*] ; 930 (70·9) were *Ascaris lumbricoides*, 109 (8·3) *Trichuris trichiura*, 18 (1·37) *Taenia* and 4 (0·3) *Enterobius vermicularis*.

For purposes of comparison he sought out the records of Visconda de Rio Branco nearby. Of 489 specimens examined in 11 months of 1948–49, 378 (77·2 per cent.) were positive for parasites : schistosomes 23 (6·0 per cent., [not 10·84 as stated], hookworms 173 (45·7), *Ascaris lumbricoides* 135 (35·7), *Trichuris trichiura* 60 (15·8), *Strongyloides stercoralis* 35 (9·2), *Taenia* 9 (2·3), *Enterobius vermicularis* 6 (1·5), *Giardia intestinalis* 27 (7·1), *Entamoeba histolytica* 288 (62·9). [The percentage figure for *E. histolytica* is unusually high.] *H. Harold Scott*

MEIRA, J. A., ELEJALDE, G. & PONTES, J. F. Sôbre a arterite pulmonar esquistosomótica. (Revisão da literatura e apresentação de três casos, dos quais um comprovado pela necrópsia). [**Pulmonary Schistosomiasis, with Details of Three Cases.**] *Arquivos Facul. de Hig. e Saude Pública Univ. de São Paulo.* 1949, Dec., v. 3, No. 2, 325-428, 24 figs. on 16 pls. English summary. [Bibliography.]

The authors present a very full account of pulmonary schistosomiasis. After a short sketch of the literature of the subject details are given of six cases of Ayerza's disease. Next follows a reproduction of Meira's clinical and pathological scheme of the forms of *Schistosoma* infestation of the lungs and notes on the symptoms produced—anaemia, cyanosis, the effect (or absence of clinical effect) on the lungs and the cardiac action. Reference is made to ERFAN's paper read before the Royal Society of Tropical Medicine and Hygiene in 1948 [see this *Bulletin*, 1949, v. 46, 57], and records are quoted of 6 cases reported by SIRRY from Alexandria. Three cases under the authors' own observation are given in minute detail ; one, a woman of 33, died and an autopsy was carried out. Except for thickening of the affected pulmonary arterioles the changes were not very marked. The other two patients, a man of 19 and another of 20 years left hospital " much improved " after treatment with antimonials. Photomicrographs show the histological changes in the lungs and the myocardial lesions in the fatal case, and radiograms of the heart and lungs and reproductions of the electrocardiographic tracings of this and one of the others are shown. *H. Harold Scott*

READ, C. P. **Anaerobic Glycolysis in Fortified Cell-Free Homogenates of Tapeworm Tissue.** *Proc. Soc. Exper. Biol. & Med.* 1951, Apr., v. 76, No. 4, 861–3.

D'IGNAZIO, C. Tenifughi e teniasi in Etiopia. (Kosso contro Kosso.) [**Tapeworm Remedies in Ethiopia.**] *Arch. Ital. Sci. Med. Trop. e Parassit.* 1951, Feb., v. 32, No. 2, 95–104. [10 refs.] English summary (2 lines).

An account is given of various remedies which the Ethiopian native takes against the tapeworm. They include (1) *Hagenia abyssinica* Gmelin, or *Brayera anthelmintica* Bruce ; (2) *Embelia shimperi* Hochst ; (3) *Myosine africana* L. ; (4) *Punica granatum* L. (the pomegranate) ; (5) *Cucurbita maxima*, *C. pepo* (the pumpkin) ; and (6) commercial motor fuel. The mode of use, effects, toxicity and rough dosage taken are discussed in the case of each

remedy. It is remarked that some of these remedies are, or have been, used in Europe and that paraffin was recommended in Italy to be taken against tapeworm as far back as the 17th century.

"Kosso" is the name given by the natives to *Hagenia abyssinica*, to the tapeworm itself, to all worm remedies and even to purgatives in general.

J. Cauchi

CALVO MELENDRO, J. La equinococosis familiar. [**Familial Hydatid Disease.**] *Archivos Internac. de la Hidatidosis.* Montevideo. 1950, Oct., v. 11, Nos. 1/2, 185–92.

CHANDRA, H. & DUTT, R. L. **Hydatid Cyst of the Spermatic Cord.** *Indian Med. Gaz.* 1951, Feb., v. 86, No. 2, 49–50.

LANDÍVAR, A. F. Equinococosis hidatidíca del hueso coxal. [**Hydatid Cyst of the Hip Bone.**] *Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1950, July–Sept., v. 26, No. 190, 159–75, 14 figs.

MINI, M. Su 34 casi di cisti da echinococco primitivo. Operati in dieci anni nella Clinica Chirúrgica di Bologna. [**On 34 Primary Hydatid Cysts operated upon in 10 Years at the Surgical Clinic of Bologna.**] *Archivos Internac. de la Hidatidosis.* Montevideo. 1950, Oct., v. 11, Nos. 1/2, 95–139, 21 figs. [55 refs.]

FANTA, E., FAIGUENBAUM, J. & NEGHME, A. Ensayo de tratamiento biológico de la hidatidosis en Chile. [**Biological Treatment of Hydatid Disease in Chile.**] *Archivos Internac. de la Hidatidosis.* Montevideo. 1950, Oct., v. 11, Nos. 1/2, 319–29. [30 refs.]

FANTA, E., FAIGUENBAUM, J. & NEGHME, A. Sobre tratamiento biológico de la hidatidosis. [**The Biological Treatment of Hydatid Infestation.**] *Rev. Med. Chile.* 1950, Dec., v. 78, No. 12, 796–8. [12 refs.]

The authors record 20 patients with hydatid whom they treated biologically, without taking them into hospital. By biological treatment they imply injection of hydatid fluid, or its albuminoid fraction or "whole antigen," intradermally at weekly intervals, starting with 0·1 cc. and increasing, if no untoward symptoms develop such as urticaria or haemoptysis, for example, by the same amount to a maximum of 1·0 cc. and this last is repeated weekly according to the progress of the case, the injections being given in 5 places near the site, each of 0·2 cc.

Surgical treatment is all very well for single cysts in accessible places, but the biopsy method is recommended for multiple cysts and for cysts in inaccessible areas. Their greatest successes have been in multiple cysts of the abdomen.

H. Harold Scott

MATILLA, V., APARICIO GARRIDO, J., PRIETO LORENZO, A. & GOMEZ CAMBA, J. Estudios sobre anquilostomiasis. IV. Los cuadros hematico y medular. [**Hookworm Studies. IV. The Blood-picture and Myelogram.**] *Med. Colonial.* Madrid. 1951, June 1, v. 17, No. 6, 555–66, 2 figs. [32 refs.]

The authors have examined the cellular constitution of the blood in 100 cases of hookworm infestation and the bone-marrow of 64 such cases. The red corpuscles in the peripheral blood ranged between a minimum of 1,700,000 and a maximum of 4,600,000 per cmm., with an average of 3,199,900; in 60 patients the figure was between 3 and 4 million and in 33 between 2 and 3

million. The type of anaemia is hypochromic, the extremes of haemoglobin being 30 and 78 per cent., with an average of 53·8; a colour index of 0·97 maximum, 0·60 minimum and average 0·85. Normoblasts were found in 21, all with a total of under 3 million per cmm. ; anisocytosis was present in 92, poikilocytosis in 64, Jolly bodies and Cabot's rings in 25 and punctate basophilia in 18. Sedimentation rate was usually below 19 mm. in the hour, and, with two exceptions (87 and 107) was never above 40 [stated in all cases as cmm.].

As regards the leucocytes, there were increased totals to 15,000 and even 20,000 per cmm. in the early stages ; later the numbers fell below normal ; in 71 the total was between 4,000 and 7,000. Eosinophilia varied much ; the maximum was 49 per cent. or 5,200 per cmm. The marrow changes are given in a table in which 25 varieties of cells are mentioned ; the maximum, minimum and average in the 64 cases, with a column stating the normal limits for comparison. Most are within the normal extremes, the marked exceptions being the eosinophiles where, in place of the normal 5, the maximum was 49 per cent. The anaemia is, in the author's opinion, due to poverty in iron. *H. Harold Scott*

CHEN, Cheng-hsien. **Acute Appendicitis caused by *Ascaris* Worms. Report of an Unusual Case with Three Worms in the Lumen of the Appendix.** *Chinese Med. J.* Peking. 1951, Mar.–Apr., v. 69, Nos. 3/4, 151–4, 1 fig.

SPRENT, J. F. A. **On the Toxic and Allergic Manifestations caused by the Tissues and Fluids of *Ascaris*. III. Hypersensitivity through Infection in the Guinea Pig.** *J. Infect. Dis.* 1951, Mar.–Apr., v. 88, No. 2, 168–77.

"1. Guinea pigs infected with the larvae of *Ascaris lumbricoides* from pigs exhibited anaphylactic shock when injected intravenously with materials obtained from whole adult ascaris, isolated adult tissues, adult metabolic products, larval tissues and larval metabolic products.

"2. A similar effect was produced by whole adult ascaris, isolated adult tissues and adult metabolic products, after treatment with trichloracetic acid.

"3. Two chemical fractions active in producing anaphylaxis were obtained from deproteinized whole ascaris tissues. One was able to sensitize guinea pigs, was insoluble in alcohol and was unaffected in its effect by phosphotungstic acid. The other was unable to sensitize guinea pigs, was soluble in alcohol and was removed by phosphotungstic acid. A similar separation was effected by saturation of deproteinized ascaris tissues with ammonium sulphate.

"4. Guinea pigs infected with decreasing doses of ascaris eggs showed that hypersensitivity through infection was instigated by a dose of 150 eggs.

"5. Immunological relationships were established by cross-sensitization between adult worm tissues, larval tissues and adult metabolic products.

"6. Ascaris-infected guinea pigs were found to manifest anaphylactic shock when injected intravenously with extracts prepared from *Ascaris columnaris*, *Toxascaris leonina* and *Physaloptera maxillaris*, but not by extracts prepared from *Trichinella spiralis*, three cestodes and a trematode.

"7. Guinea pigs sensitized with whole ascaris and with ascaris polysaccharide exhibited a similar cross-sensitization towards other helminth extracts as that exhibited by ascaris infected guinea pigs. No sensitization towards extracts of guinea pig kidney and human group A erythrocytes was manifested.

"8. Guinea pigs infected with *T. spiralis* showed anaphylactic shock when injected with whole ascaris tissues, deproteinized ascaris tissues, ascaris polysaccharide and by ascaris tissue extracts from which both proteins and polysaccharide had been removed."

[See this *Bulletin*, 1950, v. 47, 145, 1108.]

KELLER, P. & HIDE, C. G. **Sterilization of Sewage Sludges. Incidence and Relative Viability of Ascaris Ova at Sewage Disposal Works in the Johannesburg Area.** *South African Med. J.* 1951, May 19, v. 25, No. 20, 338–42.

In the course of investigations of methods for the sterilization of sewage sludges, much information has been obtained on the amount of ascariasis in the Johannesburg area. Much of that information on *Ascaris lumbricoides* is here presented.

The incidence of ascaris ova in sludge in 3 sewage works ranged from 50 to 243 ova per ml. in raw sludge, and from 105 to 552 ova per ml. in digested sludge. Tables give much detail of the results of experimental work on numbers of ova, moisture, total solids, nitrogen and carbon in the sewage at different stages of the treatment. The relative viability of the ova found in sludge at different stages in digestion and drying was also examined.

Soil irrigated with tank effluent was examined for helminth eggs on a number of occasions but with negative results. It is considered that ascaris ova are "completely inactivated after a few days, owing to radiation from the sun, desiccation and activity of soil organisms."

The high infestation of the African population with *A. lumbricoides* is responsible for the high incidence of the ova in sewage sludge. The problem of ascariasis arises, not from the use of nightsoil or sludge as fertilizing agents, but from the bad conditions of general hygiene, sanitation and housing under which the African population live. *M. E. Delafield*

JACHOWSKI, L. A., Jr., OTTO, G. F. & WHARTON, J. D. **Filariasis in American Samoa I. Loss of Microfilaria in the absence of Continued Reinfection.** *Proc. Helminthological Soc. of Washington.* 1951, Jan., v. 18, No. 1, 25–8, 1 fig.

Accurate information on the period that a population retains microfilariae in the circulation (microfilaraemia), when removed from the possibility of reinfection is important. In this study a group of 102 Samoan nurses at the hospital in Tutuila, American Samoa, was first examined. The student nurses ranged in age from 16 to 20 years, whilst the graduate nurses varied from 20 to 53 years and they came from all parts of American Samoa. They live and work in screened modern buildings where transmission of filariasis does not occur.

In undergraduate nurses of 4 to 28 months residence the microfilaria rate varied from 16·7 to 19 per cent. In 7 of 40 months residence the results were negative ; in graduates of 48 to 52 months residence, it was 4·7 to 7·6 per cent.

Of the entire group of 102 nurses of all categories only 8·9 per cent. were positive as compared with 30·2 per cent. in 434 villagers. Considerable mathematical calculations seem to indicate that the microfilariae may be expected to disappear in little more than five years after reinfection has ceased.

In May, 1950, an opportunity arose of surveying a group of Samoans residing in Hawaii, where for over 45 years there has been a migration of Samoans from both American and Western Samoa. At Laie on the island of Oahu there are 300 Samoans, both immigrants and Hawaii-born. In this study, 132 were examined for microfilariae, and of these 60 were born in Hawaii ; all of these 60 were free of microfilariae, so that it was concluded that no transmission of filariasis takes place in Hawaii. Among the immigrants, on the other hand, 8 out of 72 were infected and all of these had been in Hawaii less than five years.

Data obtained in 1943–1944 by Dr. D. D. Bonnet of the Health Department in Hawaii show similar results : 15 persons born in Hawaii were negative,

while 3 out of 32 born in Samoa were infected with microfilariae. Two had been in Hawaii for less than 3 years while the other had lived there for 6 years.

In Samoa the percentage of the population infected increases with age, so that the time trends of infection in Samoa and in Hawaii may be directly compared.

These trends are diametrically opposite in the two groups. There was an initial higher rate among the Hawaii group but this is due to the fact that all ages are included in this group. The last positive blood preparation was found in a Samoan six years removed from normal exposure in Samoa.

P. Manson-Bahr

REISEL, J. H. & GROEN, J. Tropische eosinophilie en filariasis. [**Tropical Eosinophilia and Filariasis.**] *Nederl. Tijdschr. v. Geneesk.* 1951, June 16, v. 95 (ii), No. 24, 1736–44. [Refs. in footnotes.]

The English summary appended to the paper is as follows :—

"The authors report a case of 'tropical eosinophilia' in a Netherlands woman who had been interned in a Japanese concentration camp in Sumatra. *Live* Microfilariae malayi were demonstrated in the fluid obtained by puncture of a varicose inguinal lymphcyst. The condition did not react to penicillin and neoarsphenamine, temporarily to tartras emeticus and (up till the present) permanently to anthiomaline. Attention is drawn to fundamental studies of Netherlands investigators from Indonesia and Curaçao and to the possible etiological relationship between tropical eosinophilia and filariasis."

GEUKENS. Contribution à l'étude des filarioses dans le territoire de Feshi. [**Study of Filariasis in the Feshi Region, Belgian Congo.**] *Ann. Soc. Belge de Méd. Trop.* 1950, Dec. 31, v. 30, No. 6, 1483–93, 1 map.

The distribution of onchocerciasis in the area discussed is between 5° 30′ and 6° 0′ South latitude, and in the neighbourhood of 18° 0′ East.

This focus comprises both banks of the Inzia river, in the district of Kwango (Province of Léopoldville) at an altitude of 800 metres. There, two species of *Simulium*—*S. damnosum* and *S. albivirgulatum*—abound.

Tables are given of the percentage of nodules in the inhabitants of 15 villages from which the intensity of the infection with *O. volvulus* can be gauged. In those aged 45 or over up to 100 per cent. were affected in one village. Nodules were absent in those under six years of age, while skin biopsies were likewise negative. The percentage of infection proved considerably higher in men of mature years than in women.

The left bank of the river Inzia is infested as well as the right, but it has not been possible to work out the percentages. On comparing this area with the neighbouring zones it is possible to determine that it is clearly limited to the south and east and that the distribution is determined by the presence or absence of the forest canopy.

As regards the percentage of microfilariae, neither they nor the associated nodules were found in those under the age of fourteen.

Among 30 carriers of microfilariae of *A. perstans*, 16 had microfilariae of *O. volvulus* in the skin exudate, while a carrier of larvae of *Loa loa* was also infected with those of *A. perstans* and of *O. volvulus*.

On the other hand those with nodules do not necessarily harbour microfilariae in the skin.

No case of elephantiasis was encountered in a population of 500 men and 850 women, and this fact is significant when one considers that up to 100 per cent. were infected with *O. volvulus*. This parasite is not implicated in goitre

nor in inguinal adenitis. Lichenification and xerodermia were seen in 9 men out of 117 examined. Eye complications appeared to be very rare. At Tsako Tsakosi two cases of blindness were seen in 493 nodule carriers : in other districts the percentage was even smaller.

The chief insect vector in the endemic zone is undoubtedly *Simulium renauxi* which is a new species [see below]. *P. Manson-Bahr*

WANSON, M. & HOLEMANS, K. L'habitat des stades préimaginaux de *Simulium neavei* et de *Simulium renauxi*. [**The Habitat of the Immature Stages of** *Simulium neavei* **and of** *Simulium renauxi*, **n. sp.**] *Ann. Parasit. Humaine et Comparée.* 1951, v. 26, Nos. 1/2, 93–8. [12 refs.]

Adults of *S. neavei* were first observed in the Belgian Congo in 1932, and in 1934 it was incriminated as the vector of onchocerciasis in the Sankuru area. An infection rate of 33 per cent. for all forms of the worm in wild-caught flies was recorded. As in East Africa, the immature stages long remained unknown.

Another species, *S. renauxi* sp.n., closely similar morphologically to *S. neavei*, is now also recorded as a vector of onchocerciasis at Kwango, 800 metres above sea-level in the Belgian Congo. Despite the presence of large numbers of adults the immature stages of this new species escaped discovery, although, as for *S. neavei*, extensive searches were made on stones, leaves, dead branches and the like, in the rapid hill streams of the terrain. Only *S. damnosum* and *S. johanne* were found.

However, by June 1950, it was found at Kwango that the immature stages of *S. renauxi* occurred on the fresh-water crabs (*Potamonautes lueboensis*) of the streams, a form of phoretic association reported for *S. neavei* in Kenya, by VAN SOMEREN and MACMAHON in August, 1950 [this *Bulletin*, 1951, v. 48, 181]. [This discovery by the Kenya workers was established in March, 1950.]

The breeding places of *S. renauxi*, as described in the present paper, seem to be similar in many ways to those of *S. neavei*. The crabs are abundant in the foamy parts of the streams. Both larvae and pupae of the fly occurred on the ventral surface of the crab carapace above the insertion of the legs, larvae occasionally on the pedicel of the eye, and pupae chiefly on the first segment of the pincers and the two basal segments of the legs. The numbers per crab varied from 3 to 25, adult crabs carrying the larger numbers.

There was great difficulty in obtaining successful emergences of flies from pupae isolated in damp tubes.

The respiratory filaments of the pupae of *S. renauxi* consist of 8 long filaments arising from 3 main stems.

At Lomami, *S. renauxi* was taken in its immature stages on the crab, *P. lirrangensis*.

The morphological and biological characteristics of *S. neavei* and *S. renauxi* are very similar and the authors concede that this new species may be a variety only of *S. neavei*.

[Descriptions of the different stages of *S. renauxi* are published separately in the *Rev. Zool. Bot. Afr.* 1950, in the press.] *D. S. Bertram*

TORRICO, R. A. Frecuencia de enterobiosis en algunas poblaciones de Bolivia. [**Frequency of Enterobiasis in different Communities in Bolivia.**] *An. Laboratorio Central.* Cochabamba, Bolivia. 1951, Jan., v. 3, 3–6, 1 chart.

The author examined a number of children aged 6 to 15 years for evidence of enterobiasis. The children were selected from six different areas and the author hopes to complete a survey of all departments of Bolivia. Graham's method was used for the study.

The results, shown in a table separately for boys and girls, indicate that the percentages of children found infected with *Enterobius* in Cochabamba (Department), Trinidad, Tarija (Department), Cobija, Baures and Magdalena were 51·07, 18·22, 45·50, 41·12, 39·21 and 50·68. On the whole more positives tended to be found in boys.

A graph indicates the incidence at all ages, up to 15 years in boys and girls respectively in the case of 672 children examined in the Department of Cochabamba. The incidence tended to rise irregularly until 10 to 12 years, after which there was a further rise to over 75 per cent. in boys and a fall to under 30 per cent. in girls. *H. J. O'D. Burke-Gaffney*

DEFICIENCY DISEASES

SATO, S. **On the Changes in Intermediate Metabolism of the Blood Protein and Water by Muscular Exercise in Malnutrition.** *Tohoku J. Exper. Med.* 1950, Dec. 25, v. 53, Nos. 1/2, 93–102, 2 figs. [32 refs.]

In fifteen healthy subjects a five-minute period of "standing running" produced an immediate rise in blood haemoglobin, serum proteins and colloid osmotic pressure of the serum. Within 30 minutes levels were back to or below normal.

In 12 patients suffering with malnutrition, the exercise produced slightly greater rises in these levels, but, more strikingly, the raised levels were maintained for up to 90 minutes.

[In the absence of studies in corresponding changes in blood volume and extracellular fluid, it is difficult to interpret the significance of these results. But the experimental findings clearly support the author's conclusion that "in malnutrition there is some functional disturbance in the blood protein regulating organs. With loading of muscular exercise, this disease manifests remarkable functional changes in the capillary walls for water metabolism." There is a general discussion and the references, which are mostly to Japanese literature, may be valuable to others interested in the factors determining serum protein levels.] *R. Passmore*

WILLS, Lucy & BELL, Muriel E. **The Serum-Protein Levels of Samoans, Fijians, and Indians in Fiji.** *Lancet.* 1951, Apr. 14, 820–22. [21 refs.]

Serum protein levels were estimated by the copper-sulphate method of a cross-section of the Fijian and Indian population in Fiji and of Samoans in Samoa. The mean levels in all three races at all ages were higher than the levels usual in Europeans, including Europeans living in Fiji and Samoa. The reason for the difference was not determined. Many of the subjects with a high serum-protein level had magnificent physiques. Dietary deficiencies, malaria, kala azar and filarial infections could definitely be excluded. Many of the subjects had had yaws, which had been only partially treated, and although free from symptoms they still had a positive Kahn reaction. This might possibly be a partial explanation of the high levels in Samoans and Fijians, but not in the Indians. *R. Passmore*

SCRIMSHAW, N. S., GUZMAN, M. & MENDEZ DE LA VEGA, J. **The Interpretation of Human Serum Protein Values in Central America and Panama.** *Amer. J. Trop. Med.* 1951, Mar., v. 31, No. 2, 163–73. [35 refs.]

This paper reports studies in serum protein levels carried out in Panama, El Salvador and Guatemala on school children, adults and pregnant women,

Comparisons are made with standards obtained from the normal white population of the United States. The determinations were done by the density gradient method of LOWRY and HUNTER. If the upper limit of normality is taken as 7.50 gm. per cent., then 20 per cent. of the Central Americans studied had abnormally high levels.

The authors are frankly at a loss to explain this. Racial differences, altitude differences and simple dehydration have been carefully excluded. The influence of endemic goitre and a high proportion of vegetable protein in the diet are possible causative factors. Minor deficiencies of total protein intake are certainly not responsible.

After a very full discussion the authors conclude with the definite statement that " serum protein levels cannot be used for the detection of mild to moderate degrees of protein deficiency in humans ". *R. Passmore*

AALSMEER, W. C. **Cardiovascular Symptoms of Beriberi.** *Documenta Neerlandica et Indonesica de Morbis Tropicis.* Amsterdam. 1951, Mar., v. 3, No. 1, 1–24, 15 figs. [22 refs.]

Fifteen cases of oriental beriberi seen in the rice-eating population of Java before World War II are described, and the circulatory disturbances are contrasted with reports of cases of occidental beriberi, which is usually associated with alcoholism. In oriental beriberi the essential circulatory changes are peripheral. A disturbance in tissue oxidative processes may be the primary condition and an increased demand for oxygen leads to a widening of peripheral vessels, as in a shunt circulation, and so an accelerated circulation of the blood. The symptoms may be due to a leakage in the peripheral circulation, similar to hyperthyroidism and analogous to the lateral leakage of arteriovenous fistula. The features of cardiac failure in oriental beriberi are those of a right-sided failure. On the arterial side there is a lowered diastolic pressure and a proportionately higher systolic pressure, an enhanced tendency to production of sound in the arteries. On the venous side, there are the heightened venous pressure and the so-called *Nonnensausen* (venous hum) on the large veins. Characteristically, symptoms of pulmonary congestion, attacks of cardiac asthma, and evidence of insufficiency of the left heart, which are often described in occidental beriberi, are absent in oriental beriberi. In alcoholic beriberi changes are frequently described in the electrocardiogram, such as a low voltage of the QRS complexes, flattening and inversion of the T tops in leads 1–2 and lengthening of the P–R interval and extrasystoles. These changes are not found in oriental beriberi. Indeed in 134 electrocardiograms from these 15 patients, the QRS complexes were normal and there was no disturbance of rhythm. There were no low voltages of either R or T.

It is concluded that the condition known as alcoholic beriberi presents cardiovascular signs and symptoms quite distinct from those of oriental beriberi and so cannot be a pure avitaminosis B_1. By coupling too much together oriental and occidental beriberi, confusion and difficulties have arisen.

R. Passmore

SCHWENDY, J. Über sekundäre Pellagra. [**Secondary Pellagra.**] *Deut. Gesundheitswesen.* 1950, Mar. 2, v. 5, No. 9, 284–7. [15 refs.]

By the term " secondary pellagra " the author implies some of the conditions known among us as " pellagroid ", notably those associated with roughness of skin and pigmentation of the back of the hands, facial oedema and gastro-intestinal disturbance, with or without central nervous upset accompanied by

depression, mental anxiety, nervous exhaustion, irritability, quarrelsomeness, forgetfulness and the like, all the symptoms being more marked in the summer months.

Three such cases are detailed ; gastric analysis showed reduced acid values to anacidity and improvement followed the administration of nicotinamide injections in two of the patients, but the third, a man of 47 years, went steadily downhill, the mental disturbances increased and the case ended fatally.

H. Harold Scott

BERTRAND, J. Protéines. Hypoprotéinose. [**Proteins—Hypoproteinosis.**] *Bruxelles-Méd.* 1951, Apr. 22, v. 31, No. 16, 851–60, 1 fig.

The author, who is a physician at Jadotville in the Belgian Congo, described a disease known as *mbwaki* and *diboba* in various parts of the Belgian Congo, which he considers to be the same as that known as kwashiorkor in Nigeria, malignant malnutrition in Kenya and infantile pellagra in the Sudan. The primary aetiological factor is considered to be an insufficiency of dietary protein. This paper is a straightforward account of the basic physiology and clinical features, eminently suited to the needs of a newcomer to Africa.

R. Passmore

OOMEN, H. A. P. C. **Malignant Malnutrition in Indonesian Children.** *Documenta Neerlandica et Indonesica de Morbis Tropicis.* Amsterdam. 1951, Mar., v. 3, No. 1, 49–59, 5 figs. [15 refs.]

Typical descriptions are given of kwashiorkor, as seen in Macassar. The author believes that Napier's answer, as regards India, concerning the incidence of this disease applies also to Indonesia : " We have been surrounded by it for 25 years, but did not recognize it ".

R. Passmore

VAN DER SAR, A. **Incidence and Treatment of Kwashiorkor in Curaçao.** *Documenta Neerlandica et Indonesica de Morbis Tropicis.* Amsterdam. 1951, Mar., v. 3, No. 1, 25–44, 18 figs. [22 refs.]

Characteristic cases of kwashiorkor are described. There are excellent photographs showing the thin, straight, discoloured hair, sores at the muco-cutaneous junctions, general oedema, hyperpigmentation and depigmentation of mosaic skin, and crazy-pavement dermatosis. Microphotographs of liver, obtained by biopsy, show the fatty infiltration. Excellent results were obtained by treatment with " protein milk " containing 1,330 mgm. methionine, 80 mgm. choline and 70 mgm. inositol per 100 gm. In addition blood transfusions were frequently thought to be helpful.

Over half the cases seen were children of unmarried mothers ; poverty, neglect and ignorance were frequent causes of the underlying poor nutrition.

R. Passmore

MANSON-BAHR, P. E. C. **Malignant Malnutrition in Fiji.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1951, Apr., v. 44, No. 5, 555–8, 8 figs. on 4 pls. [31 refs.]

Three characteristic cases of kwashiorkor are described occurring in Fiji. All three patients died and the diagnosis was confirmed at postmortem. There are beautiful photomicrographs of the essential degenerative lesions in the pancreas and liver. The paper extends our knowledge of the geographical range of kwashiorkor. [It is uncertain why the author continues to use the term " Malignant Malnutrition ", an unsuitable descriptive label, discarded now by its originator.]

R. Passmor

DARBY, W. J. **Advances in the Therapy of Nutritional Deficiencies.** *Amer. J. Trop. Med.* 1951, Mar., v. 31, No. 2, 183–91. [35 refs.]

"Nutritional planning is . . . the bringing together of the basic knowledge of chemistry, bacteriology, parasitology, biology, food science, anthropology, agriculture and clinical medicine." This theme is elegantly elaborated in a memorial lecture, in which most of the examples are taken from recent developments of knowledge of the nutritional anaemias. *R. Passmore*

HAEMATOLOGY

BLITSTEIN, I. Hématologie normale des Noirs du Congo Belge. Deuxième mémoire. Sang et moelle osseuse des nouveau-nés et nourrissons jusqu'à l'age de 15 jours. [**Normal Haematology of Africans in the Belgian Congo. Second Note : Blood and Bone Marrow of Infants up to the Age of 15 Days.**] *Ann. Soc. Belge de Méd. Trop.* 1951, Feb. 28, v. 31, No. 1, 3–26. [12 refs.]

MANSON-BAHR, P. E. C. **Megaloblastic Anaemia in Fiji.** *J. Trop. Med. & Hyg.* 1951, May, v. 54, No. 5, 89–93, 6 figs. [22 refs.]

Ninety-one cases of megalocytic anaemia observed among the Indian population in Fiji during two years are described. The variable nature of this disease is confirmed, especially as regards the response to specific therapy. Many cases, especially in pregnancy, failed to respond to vitamin B_{12}, but recovered rapidly when given folic acid. In no case was there a failure to respond to this factor.

The disease shows a well-marked seasonal exacerbation in the second half of the year. It is suggested that there is a general deficiency of vitamin B_{12} in Indian diets and that the effect of this deficiency is magnified either by the presence of inhibitors or absence of folic acid conjugates from the food during this season. *R. Passmore*

TOLENTINO, P. **Mechanical Fragility of Thalassaemic Erythrocytes.** [Correspondence.] *Nature.* 1951, June 2, 905, 1 graph.

LIQUORI, A. M. **Presence of Foetal Haemoglobin in Cooley's Anaemia.** [Correspondence.] *Nature.* 1951, June 9, 950–51. [13 refs.]

The author, writing from Rome, refers first to a case of Cooley's anaemia in a patient aged 9, from whom haemoglobin when crystallized resembled the crystals of foetal haemoglobin.

He then draws freely on the literature and shows that evidence obtained by four independent methods suggests that a considerable proportion (probably about half) of the haemoglobin of patients over 8 years with Cooley's anaemia consists of foetal haemoglobin. Normally, the foetal form is completely replaced by the adult form in the first six months of life : the results referred to indicate that Cooley's anaemia may be associated with a congenital inability to complete the change-over of the haemoglobin synthesis from the foetal to the adult form.

These results have been confirmed in four other cases which occurred in children of Italian origin living in New York. Details are to be published elsewhere. *H. J. O'D. Burke-Gaffney*

HEILMEYER, L., MÜLLER, W. & SCHUBOTHE, H. Über eisenrefraktäre, kobaltsensible Anämien und zur Frage des Vorkommens der Thalassaemia minor in Deutschland. [**Anaemia Refractory to Iron and Responding to Cobalt : the Presence of Thalassaemia Minor in Germany.**] *Klin. Woch.* 1951, May 15, v. 29, Nos. 19/20, 333/5, 2 figs. [20 refs.]

The authors give details of three cases of chronic anaemia which were refractory to iron, but two of which responded to treatment with cobalt. These cases showed the characteristics of Cooley's [Mediterranean] anaemia [thalassaemia minor]. Comparable findings were detected, but in a less marked degree, in relatives of one of the patients.

As no descent from persons of Mediterranean origin could be traced in any of the patients, the authors suggest that thalassaemia minor also occurs sporadically in Germany. *H. J. O'D. Burke-Gaffney*

ABBASY, A. S. **Sickle Cell Anemia ; First Case reported from Egypt.** *Blood.* 1951, June, v. 6, No. 6, 555–8, 2 figs. [22 refs.]

" Rheumatic fever, rheumatic arthritis, acholuric jaundice were excluded in this case on the clinical and laboratory findings. The history, physical examination and the laboratory studies all supported the diagnosis of sickle cell anemia.

" This case presents certain points of interest. It is the first case of sickle cell anemia reported from Egypt. The disease was found in the patient and her father and excluded in the other members of the family. It is, however, possible that the paternal uncle had also suffered and died from the disease.

" The patient is a white girl and admixture of Negro blood was reasonably excluded through 6 ancestral generations. This case, therefore, adds to those already described in subjects of the white race from the Mediterranean area. It will be noticed that the patient's family originates from Algeria, where 3 cases were diagnosed in natives by Smith on the basis of the anatomical changes observed in the spleen."

DREYFUSS, F. & BENYESCH, M. **Sickle-Cell Trait in Yemenite Jews.** [Correspondence.] *Nature.* 1951, June 9, 950.

As part of a survey of Mediterranean blood properties the authors, in Jerusalem, examined 105 children admitted consecutively to the Hadassah Children's Hospital. All were Yemenite Jews recently arrived and 7 cases presenting the sickle-cell trait were found among the 105. In 6 of the 7 cases, it was possible to examine members of their families and this brought to light 5 more cases (two in adults) bringing the total positives up to 12 or over 11 per cent.

There is a doubt about the racial origin of the Yemenite Jews, but they are usually regarded as descendants of a group of Jews originating in the Eastern Mediterranean (though some believe them to be aborigines of Yemen who adopted the Jewish religion long ago). In any case they bear no resemblance to Negroes nor, it is stated, is a heavy admixture of Negro blood at all probable.

The high rate of positive findings suggests to the authors that they may be dealing with a new source of the sickling gene, independent of the known reservoir among Negroes.

This appears to be the first finding of sickle-cells in any group of Jews. No reports of sickle-cell disease have come to these authors' attention from Israel and the Arab countries.

A detailed report of the authors' findings will appear elsewhere.

H. J. O'D. Burke-Gaffney

LANGUILLON, J. L'anémie à hématies falciformes. (A propos de six observations personnelles chez des Noirs de la Guadeloupe. [**Sickle-cell Anaemia ; Six Cases in Negroes of Guadeloupe.**] *Rev. Colonial de Méd. et Chir.* 1951, May 15, v. 23, No. 190, 114–26. [33 refs.]

LANGE, R. D., MINNICH, Virginia & MOORE, C. V. **Effect of Oxygen Tension and of pH on the Sickling and Mechanical Fragility of Erythrocytes from Patients with Sickle Cell Anemia and the Sickle Cell Trait.** *J. Lab. & Clin. Med.* 1951, May, v. 37, No. 5, 789–802, 8 figs. [19 refs.]

"The erythrocytes of sickle cell anemia and sickle cell trait patients were studied by measuring the mechanical fragility and degree of sickling under different oxygen and hydrogen-ion concentrations.

"The results demonstrate : (1) that the hemolysis produced by mechanical trauma of both types of red cells increased as the percentage of sickling increased ; (2) that both pH and oxygen tension are important factors in regulating the degree of sickling ; (3) that CO_2 produces its effect on sickling by lowering the pH ; (4) that an oxygen tension of below 45 mm. Hg is needed to produce sickling of the erythrocytes from some sickle cell anemia patients ; (5) that, in general, trait erythrocytes are more resistant to changes in both pH and oxygen tension than are anemia cells.

"It is suggested that this difference in the susceptibility of sickle cell anemia and trait erythrocytes to sickling, plus the accompanying differences in mechanical fragility, may explain why sickle cell anemia and sickle cell trait differ in their clinical and hematologic manifestations."

HENDERSON, A. B. **Sickle Cell Disease : Studies on "in Vivo" Sickling and the Effect of certain Pharmacological Agents.** *Amer. J. Med. Sci.* 1951, June, v. 221, No. 6, 628–35, 4 figs. [19 refs.]

"Twenty-six subjects having sickle cell anemia were observed during the acute and chronic phases of the disease. Increased intravascular hemolysis is a more or less constant feature of the disease, and the resulting anemia and accelerated erythrocytogenesis are found during both periods. Sudden massive destruction of the erythrocytes does not appear to explain the symptoms at the time of the crisis.

"Variations of *in vivo* sickling may occur. The clinical crisis may be associated with few or numerous sickled forms in venous blood. Although severe sickling was often associated with the crisis, even more severe sickling may be observed without clinical symptoms.

"The effects of certain pharmacological agents on the course of the disease are presented, and the results are as follows : (1). An anticoagulant agent (dicumarol) did not prevent a transitory attack of pain.

"(2). Increase in the blood flow appeared to give transitory relief during a crisis.

"(3). An oxidation agent (methylene blue) had no effect on the course of the disease.

"(4). An adequate diet did not appear to affect intravascular hemolysis.

"(5). The results of blood transfusions are in agreement with the findings of Kaplan and Lewis."

EPIDEMIC DROPSY

LAL, S. B. **Epidemic Dropsy in Bihar.** *Indian Med. Gaz.* 1951, Feb., v. 86, No. 2, 64–71. [11 refs.]

Brief notes are given of eight outbreaks of epidemic dropsy, six of them nvestigated by the author and two from records. All go to prove—if proof is any longer needed—that the actual cause of epidemic dropsy is argemone oil from seeds of *Argemone mexicana* adulterating mustard seed. Outbreaks investigated by the author were :

1. Japla, on the river Sone, with a population of about 6,000. Attacks began in October 1948 and the sequence in successive months was 2, 1, 5, 26, 56 ; in March 1949 there were none. There were 4 more cases in the adjoining hamlet w here the same oil was used. It was found to contain 2 per cent. of argemone oil.

2. Jhumri-Telaiya, a town with a population of 40,000. The first case was reported in the last week of November 1949 and from then to March the numbers in successive months were respectively 27, 64, 18, 9 and 8. Thirty-seven families were affected and samples of mustard oil were obtained from 15 of them ; all contained 2 per cent. argemone oil.

3. Dinapore, about 6 miles west of Patna. There is a military cantonment here. Seventy cases occurred in January 1950 and 49 in February. Twenty-two samples of the mustard oil were examined and all contained 2–3 per cent. of argemone oil. There was no case among the military who procured their mustard oil from a different mill. Those samples which were found to be adulterated were seized and no more cases occurred.

4. Patna, the capital of Bihar State, has a population of about 400,000. Altogether 168 cases were reported ; 8 in November 1949, 9 in December, 91 in January 1950, 60 in February, all in 55 families. Samples of the oil used in 28 of these were obtained and all contained adulteration with argemone oil.

5. Deoghar, an important Hindu religious centre. In January 1950 there were 27 cases and in February 11. All the families affected obtained their mustard oil from the same vendor and his oil was found adulterated ; samples from other shops were negative.

6. Jamshedpore, a large industrial town with the Tata Steel Works. Sixty-one cases were reported early in 1950 ; in January 26, in February 16, and in March 19. Argemone oil was found in the mustard oil used.

7 and 8. The two outbreaks reported from records occurred at Jhajha (Monghyr) where there were 240 cases and 10 deaths, and Bhagalpore. The same history of the use of contaminated mustard oil was obtained.

Details of 8 cases are given. In all the outbreaks the onset was usually with gastro-intestinal symptoms and later oedema of feet and legs, tachycardia, dyspnoea, erythema of extremities and, in a few, ocular pain with congested disks. In fatal cases death was due to cardiac dilatation.

Generally speaking, more Bengalis were attacked than those of other races, and males more than females ; children under 8 years of age escaped, as did those adults who used mustard oil sparingly ; in all instances stopping the supply of mustard oil adulterated with argemone oil put an end to the outbreak.

H. Harold Scott

VENOMS AND ANTIVENENES

VAZ, E. Instituto Butantan. [**The Butantan Institute.**] São Paulo, Brasil : Caixa Postal 65. 1951, 61 pp., 40 figs.

A booklet of the highest interest both for the specialist and for the general public. It not only presents a record of the origin and development of the

Butantán Institute and of its work, but illustrates several of the most important snakes, venomous and non-venomous, of Brazil, and the scorpions and spiders, with notes on them, treatment of wounds inflicted by them, and instructions on methods of capture and despatch to the Institute.

The Institute began in a very small way as a laboratory for preparing anti-plague vaccines and sera, in a cowshed in 1899, and within so short a time as two years extended its activities to the study of venomous animals, their geographical distribution, biology, the composition of the venoms and also the preparation of other products for the service of Public Health, bacteriology, chemistry, antisera preparations and so forth.

The snakes are maintained in special serpentaria, or snake-pits, and their venoms are collected every fortnight. There is a separate serpentarium for constrictors and non-poisonous snakes. Nearly 20,000 snakes are received annually at the Institute.

A list of the common snakes of Brazil is given : seven species of *Bothrops*, which constitute the majority of the poisonous snakes of the country, 3 species of *Micrurus*, or Coral snakes, one each of *Lachesis* (*L. muta* or the Bushmaster) and of *Crotalus* (*C. durissus terrificus*). Of the non-poisonous snakes there are four belonging to the *Boidae*. One of these, *Eunectes murinus*, or anaconda, is said to be the biggest snake in the world, attaining a length of 12 metres. There are 10 species of aglyphous *Colubridae* and 5 of the opisthoglypha, one of which, *Pseudoba cloelia* (or mussurana, king snake) hunts and devours poisonous snakes ; one is depicted swallowing a Jararaca, one of the *Bothrops* genus. The cangamba (*Conepatus chilensis*), a skunk-like animal is also a snake-eater and appears to be immune to the venom.

There are two common and dangerous scorpions, the yellow *Tityus serrulatus*, and the dark red *T. bahiensis*. There are several dangerous and venomous spiders, particularly the "wandering spiders", *Phoneutria* (*P. feza*) and the "wolf spiders", *Lycosa* or tarantulas (*L. erythrognata*). The booklet is abundantly illustrated. *H. Harold Scott*

CHIPIAKOFF, V. Influência do congelamento em presença de fenóis sôbre o poder coagulante do veneno de jararaca. [**Influence of Freezing in the Presence of Phenols on the Clotting Properties of the Venom of** *Bothrops jararaca*.] *Rev. Brasileira Biologia.* 1950, Sept., v. 10, No. 3, 333–8.

The English summary appended to the paper is as follows :—

"Freezing (between –20 and –12°C) of dilute solutions of the venom of *Bothrops jararaca* in presence of phenols induces a marked decrease in its blood clotting and proteolytic power ; at the same time a precipitate is formed.

"In solutions super-cooled at the same temperature no changes occur.

"The frozen solutions recover partly their original activity after standing for several hours at room temperature ; however, there is no redissolution of the precipitate formed.

"Substances of high molecular weight such as amylum, glycogen, gelatin, casein, blood serum proteins and egg albumin in concentrations above 2% prevent the action of the phenols.

"The venoms of *Bothrops atrox*, *Crotalus terrificus terrificus*, pancreatin, and papain in dilute solutions also undergo reduction in their specific activity.

"In dilute solutions of blood serum proteins and of egg albumin freezing in presence of phenols causes the formation of a precipitate.

"The observed changes may be regarded as manifestations of denaturation.

"Incidentally the presence of small amount of a tyrosinase in the venom of *Bothrops jararaca* was observed."

AZEVEDO, M. P. & MARTIRANI, I. Acção proteolítica do veneno da *Bothrops jararaca* (Wied). I. Acção sôbre hemoglobina e caseina. [**Proteolytic Action of** *Bothrops jararaca* **Venom. I. Action on Haemoglobin and Casein.**] *Mem. Inst. Butantan.* 1949, v. 22, 31–46, 10 graphs. [15 refs.] English summary.

MARTIRANI, I. & AZEVEDO, M. P. Acção proteolítica do veneno da *Bothrops jararaca* (Wied). II. Acção sôbre a gelatina. [**Proteolytic Action of** *Bothrops jararaca* **Venom. II. Action on Gelatin.**] *Mem. Inst. Butantan.* 1949, v. 22, 47–61, 4 charts. [28 refs.] English summary.

DA SILVA, T. L. Escorpionismo em Ribeirão Preto, Estado de São Paulo. Notas sôbre epidemiologia e profilaxia. [**Scorpion Stings in Ribeirão Preto, São Paulo ; Epidemiology and Prophylaxis.**] *Arquivos de Hig. e Saúde Pública.* S. Paulo. 1950, June, v. 15, No. 44, 79–90, 1 graph & 1 plan. English summary.

Ribeirao Preto, a town of some 77,500 inhabitants, is situated in the interior of the State of São Paulo and 295 kilometres from the capital. Scorpions are a serious menace and an increasing one. In 5½ years from January, 1945, there have been 985 known cases and 7 of them fatal. There are three species : *Tityus serrulatus, T. bahiensis* and *Bothriurus bonariensis.* They lurk and breed mainly outside the houses, but many are found indoors, in baths, in kitchens, and in refuse dumps, brick piles and in gardens. The first-named, *T. serrulatus*, is by far the most common ; in 1949 and the first 7 months of 1950, 4,627 of these have been captured, but only 357 of *T. bahiensis* and 29 of *Bothriurus bonariensis.* As indicating the growing importance of the question, in the 5 years 1945 to 1949 the numbers of persons reported as having been stung have been successively, 48, 65, 83, 196 and 330 and in the first 7 months of 1950 there were 263.

Benzene hexachloride, 10 per cent. and DDT, 30 per cent. have proved fairly effective insecticides and more is being done in the way of education and instruction of the people and sanitary measures to avoid accumulations of rubbish.

The paper includes tables giving the numbers according to age and sex, and month by month during the 5½ years. Although *T. serrulatus* moves about chiefly at night, more stingings occur during the day because of their being disturbed when they are resting by people moving about and clearing away rubbish. *H. Harold Scott*

DERMATOLOGY AND FUNGUS DISEASES

FLOCH, H. & CONSTANT, Y. Notes sur la symptomatologie et la thérapeutique de la papillonite guyanaise. [**Symptoms and Treatment of "Butterfly Dermatosis" in French Guiana.**] *Bull. Soc. Path. Exot.* 1951, v. 44, Nos. 3/4, 178–81.

A description is given of the urticarial skin lesions produced in French Guiana by contact with a butterfly *Hylesia urticans.*

These may appear at a distance from the contact point as secondary lesions, in covered parts of the body.

A lotion of hyposulphite of soda [presumably thiosulphate] (50 per cent.), applied within a quarter of an hour, causes rapid disappearance of the lesions and the pruritus.

Conjunctivitis, facial oedema and even keratitis have been observed, and upper respiratory lesions are also attributed to the scales of this butterfly. Symptoms are relieved by the antihistamine drugs. *C. C. Chesterman*

RANIER, A. **Primary Laryngeal Blastomycosis. A Review of the Literature and Report of a Case.** *Amer. J. Clin. Path.* 1951, May, v. 21, No. 5, 444–50, 4 figs. [14 refs.]

Primary laryngeal blastomycosis, an uncommon disease, is probably not so rare as the total of six cases reported in the literature might indicate. From the author's review of these six cases it appears that the commoner signs and symptoms, in order of their frequency, were hoarseness, muscular weakness, loss of weight, dyspnoea, cough, dysphagia, pain and low-grade fever. Five of the cases were diagnosed as laryngeal tuberculosis and the sixth as carcinoma before the true diagnosis of blastomycosis was established by biopsy and histological and cultural examinations. Five of the cases were reported between 1918 and 1928 and the sixth in 1936. The following complications occurred : pulmonary blastomycosis ; perilaryngeal extension involving the skin of the neck ; laryngeal stenosis resulting from fibrosis which, in four of the cases, necessitated tracheotomy ; oesophageal stricture ; generalized dissemination of the disease ; carcinoma. Treatment with potassium iodide was effective in all but two of the cases.

The author's own patient, a Negro aged 44, suffered from persistent hoarseness, weakness and severe cough with blood-streaked purulent sputum, which had commenced three months previously during an influenza-like incident. The epiglottis and the interior of the larynx, from the arytenoids to the subepiglottic area, showed thickening and infiltration of the mucosa with polypoid growths. Movements of the vocal cords were restricted and the appearance suggested laryngeal carcinoma or syphilitic laryngitis. An X-ray examination of the chest revealed dense thickening in the hilar regions with probable cavitation near the right hilum, and fibrosis throughout both lung fields, recalling the picture of bronchogenic carcinoma.

The diagnosis of blastomycosis was established by microscopy and culture of *Blastomyces dermatitidis* from material obtained from the larynx by biopsy. The blastomycin skin test gave a negative result but the complement-fixation test was positive at a serum titre of 1 in 64 ; a very bad combination in prognosis. Despite treatment with potassium iodide, death occurred after one year's illness. *J. T. Duncan*

HEAT STROKE AND ALLIED CONDITIONS

LADELL, W. S. S. **Changes in Sweating after Prickly Heat.** *Brit. Med. J.* 1951, June 16, 1358–60, 2 figs. [18 refs.]

The opportunity arose of observing a laboratory worker who had never been in the tropics before and who arrived in Nigeria in September, 1950. An initial routine acclimatization test consisting of 20-minute cycles of work and rest in a climatic chamber was carried out in October 1950.

A few weeks later, after a cricket match, the man developed a severe prickly heat which he treated with a lotion of salicylic acid, and perchloride of mercury in 30 per cent. spirit. He also anointed himself with red palm oil after bathing. A month later the skin was clear except for a few small patches on the wrist and back. In March 1951, after he had been going into the climatic chamber 3 or more times a week for 20 weeks, he was retested under identical conditions

to determine to what extent he had become acclimatized. The results obtained showed no evidence of acclimatization ; the final rectal temperature was 0·5°F. higher in the second experiment, the sweat rate never exceeded that achieved during his first test and salt losses were higher, the mean concentration of chloride in the sweat had increased from 0·38 per cent. to 0·49 per cent. expressed as sodium chloride. The man showed mild but typical signs of Type II heat exhaustion [see this *Bulletin*, 1945, v. 42, 143].

The author suggests that three factors were concerned in producing this unexpected finding, namely prickly heat, sunburn and the mercury impairing the functional efficiency of the sweat glands.

Opportunity to reduplicate the conditions of this test are rare but perhaps the hardy volunteer will consent to act again as a human guineapig after a further period of six months, at a time when he is free from prickly heat, to see if his sweat glands have recovered their functional efficiency.

T. C. St. C. Morton

JAUSION, H., CALOP, R., BENARD, P. & ABOUD, B. Les topiques contre le soleil. [**Topical Applications for Protection against Insulation.**] *Maroc Méd.* 1950, Nov., v. 29, No. 306, 985–9.

PROTOZOOLOGY : GENERAL

CUBONI, E. La toxoplasmosi. Vie di propagazione—procedimenti diagnostici. [**Toxoplasmosis, its Transmission and Diagnosis.**] *Ann. d. San. Pubblica.* Rome. 1951, Jan.–Feb., v. 12, No. 1, 3–12, 1 fig.

The English summary appended to the paper is as follows :—

" To a brief exposition of the fundamental data on morphological structure, pathogen power, classification, possibility of cultivation of *Toxoplasma gundii*, there follows the summary of present-day knowledge on the possible ways of transmission of toxoplasmosis and a description of diagnostic laboratory methods."

WIECK, C. Zur Pathogenese und Klinik der Toxoplasmose beim Menschen. [**The Pathogenesis and Clinical Features of Human Toxoplasmosis.**] *Deut. Gesundheitswesen.* 1951, Feb. 15, v. 6, No. 7, 186–90. [19 refs.]

A general discussion, with account of a case in Germany.

CROSS, Joy B. **Diasone and Promin as Therapeutic Agents in Experimental Toxoplasmosis.** *Proc. Soc. Exper. Biol. & Med.* 1951, Mar., v. 76, No. 3, 548–51. [16 refs.]

The strain of *Toxoplasma* used in these experiments is almost invariably fatal to mice 7 to 8 days after subcutaneous inoculation. The method of infection and administration of drugs has been described [*Texas Rep. Biol. & Med.* 1948, v. 6, 260]. The two substances mentioned in the title were investigated for chemotherapeutic activity because they have proved beneficial in treatment of leprosy, in which the distribution of the organisms corresponds partly with that in toxoplasmosis. Promin was given subcutaneously in doses of 40 mgm. daily for two weeks followed by one week's rest during which a single mid-week injection was sometimes given ; and some cures were obtained. It appeared to give better results than sulphapyridine, which with sulphathiazole is most effective in the treatment of the disease in man. Diasone when given in 0·5 per cent. concentration in diet protected mice better than Promin, especially if

treatments were delayed. Both substances have been successfully used in mice to eliminate carriers. As a result of 6 weeks' daily treatment with Promin spaced as described, some mice survived more than a year. Diasone was even more effective and less toxic. *J. D. Fulton*

ENTOMOLOGY AND INSECTICIDES: GENERAL

[Papers on the toxic effects of insecticides in man are abstracted in the *Bulletin of Hygiene* under the general heading of Occupational Hygiene and Toxicology.]

EADS, R. B., MENZIES, G. C. & OGDEN, L. J. **Distribution Records of West Texas Mosquitoes.** *Mosquito News.* 1951, Mar., v. 11, No. 1, 41–7.

DEANE, L. M., DEANE, M. P. & DAMASCENO, R. G. Encontro e descrição do macho do "Anopheles (Lophopodomyia) squamifemur" Antunes, 1937 (Diptera, Culicidae). [**Finding and Description of a Male** *Anopheles* (*Lophopodomyia*) *squamifemur* **Antunes, 1937, in Brazil.**] *Rev. Serviço Especial de Saúde Pública.* Rio de Janeiro. 1950, Jan., v. 3, No. 2, 479–90, 5 figs. English summary.

CAUSEY, O. R., DEANE, L. M. & DEANE, M. P. Descrição de um novo anofelino da parte alta do Vale do Amazonas, "Anopheles (Nyssorhynchus) galvãoi" N.Sp. [**Description of a New Anopheline from the High Region of the Vale do Amazonas Area,** *Anopheles* (*Nyssorhynchus*) *galvãoi*.] *Rev. Serviço Especial de Saúde Pública.* Rio de Janeiro. 1950, Jan., v. 3, No. 2, 491–5, 5 figs.

GREENBERG, J. **Some Nutritional Requirements of Adult Mosquitoes** (*Aëdes aegypti*) **for Oviposition.** *J. Nutrition.* 1951, Jan. 10, v. 43, No. 1, 27–35, 2 figs. [13 refs.]

The mosquitoes, *Aëdes aegypti*, were allowed to feed on the test fluids through a membrane of dehydrated chick skin, the fluids being at a temperature of about 40°C. [this *Bulletin*, 1946, v. 43, 710; 1950, v. 47, 407]. Defibrinated blood of rabbit, chick, sheep, and man and washed erythrocytes suspended in physiological saline were tested. Sheep erythrocytes in saline yielded only $4{\cdot}6 \pm 1{\cdot}0$ eggs per female, but all the other diets resulted in egg yields from 27·1 eggs per female (human erythrocytes in saline) to 95·8 eggs per female (defibrinated chick blood). Since mosquitoes would not feed on test fluids which did not contain at least a few erythrocytes, the low egg yield on the diet of sheep erythrocytes in saline was used as a criterion for detecting the effects of various substances on oviposition, if added to this basic diet. Ringer's or Locke's solution gave no significant increase. Cumulative additions to the sheep erythrocytes and Locke's solution of manganese, copper, and zinc as sulphates, iodine as sodium iodide, glucose, thiamine, nicotinic acid, riboflavin, pyridoxine, *p*-aminobenzoic acid, biotin ethyl ester, pteroylglutamic acid, choline chloride, and ±inositol, were also without effect. On the other hand, the addition of bovine plasma albumin gave an increase to 19 eggs per female. The yield was not improved by adding vitamin A or D to this diet. A number of other proteins derived from blood and other sources also showed that substances of protein nature and some protein products were important factors in egg production. Tests of nine amino-acids then showed that of these, only isoleucine produced a significant increase in oviposition. Although isoleucine is important in egg production, other undetermined substances also appear to be involved and require to be investigated. *D. S. Bertram*

SACCÀ, G. Esperienze d'incrocio fra *Musca domestica* L., *Musca vicina* Mq., *Musca nebulo* F. [**Crossing Experiments with** *Musca domestica*, *Musca vicina* **and** *Musca nebulo*.] *Riv. di Parassit.* Rome. 1951, Jan., v. 12, No. 1, 47–52.

The English summary appended to the paper is as follows :—

" The author refers on crossing experiments between : (1) *Musca domestica* L. and *Musca vicina* Mq. ; (2) *Musca domestica* L. and *Musca nebulo* F. ; (3) *Musca vicina* Mq. and *Musca nebulo* F. ; he obtained positive results in 100% of cases for the first crossing, in 55% for the second and in 50% for the third crossing. The offsprings were 100% fertile for at least two generations. These results, for most zoologists, show specific identity in the three forms ; however, before reaching such a conclusion, the author proposes to discuss the matter in a next paper, based on further experimenting."

BURGESS, R. W. **The Life History and Breeding Habits of the Eye Gnat,** *Hippelates pusio* **Loew, in the Coachella Valley, Riverside County, California.** *Amer. J. Hyg.* 1951, Mar., v. 53, No. 2, 164–77. [12 refs.]

The predominant eye-gnat of the Coachella Valley, California, is *Hippelates pusio*. This paper is an account of an investigation into its life history, carried out over the four years ending 1933. Trapping of the flies provided information on foods, colour reactions, altitudes, seasons, etc. and soil caging yielded information about the immature stages and the types of soil preferred for breeding ; field work was supplemented by rearing in the laboratory.

It is well known in this part of California that the spring emergence of eye flies is very sudden and noticeable but this work showed that there was an autumn increase also, and that decreases occurred in winter and summer ; the winter was passed mainly in the young stages. The soils preferred for breeding are light and sandy and contain freshly ploughed-in moist organic matter. After the initial cultivation little breeding occurs.

In the laboratory the usual duration of the life cycle was 28 days, though in nature this period may be extended to 6 or even 12 months. Adults may live 2 months and the pupa can withstand a degree of desiccation ; one pupa remained alive in an air-dried medium for 2½ months and gave rise to an adult 2 days after moisture was added. The female lays up to 50 eggs in a batch and may lay another, smaller batch 7 days later.

These flies are numerous in the valleys, but away from the cultivated areas they can be found in damp places near streams and at the edges of forests ; they follow cultivation and are transported by vehicles. *H. S. Leeson*

DAMASCENO, R. G. & AROUCK, Regina. Descrição de uma nova espécie de Flebótomo encontrada no estado da Bahia, *Flebotomus digitatum* (Diptera-Psychodidae). [*Phlebotomus digitatum*, **a New Species encountered in Bahia, Brazil.**] *Rev. Serviço Especial de Saúde Pública.* Rio de Janeiro. 1950, Jan., v. 3, No. 2, 465–71, 8 figs.

The English summary appended to the paper is as follows :—

" The authors describe a new species of *Phlebotomus* captured in a tree trunk in the locality of Banco Central, Ilhéus County, State of Bahia.

" *Phlebotomus digitatum* n.sp. is more closely related to *P. lanei* and *P. christophersoni* species from which it is mainly differentiated by presenting hairs with different morphology and implantation in the median gonapophysis."

GHOSH, S. M. **On the Control of Phlebotomus (Sandflies) with D.D.T. and B.H.C. (Gammexane).** *Indian J. Malariology.* 1950, June, v. 4, No. 2, 175–84.

Previous observations of the effect of residual insecticides on *Phlebotomus* species have been carried out on houses of stone or other similar solid construction. Information was needed on their efficacy when applied to absorbent mud walls. Five villages were chosen in Bengal, in which houses and cattle sheds were infested by *P. argentipes*, *P. papatasi* and *P. minutus*. All houses were of mud construction and breeding of the first two species was chiefly under earthenware animal-feeding troughs, in the moist dark corners of cowsheds and to a certain extent in the moist rat holes around them. *P. minutus* breeding places could not be discovered.

Treatment was applied on the inner surfaces of the inner walls of living quarters and cowsheds up to a height of three feet. In all cases kerosene solution was used. The doses of active insecticide per square foot and the time of reappearance of sandflies after spraying were :—

	Insecticide	Dose	Reappearance of sandflies
1.	5% DDT...	1,440–1,680 mgm. per square foot	7–8 months
2.	5% DDT...	1,440–1,680 mgm. per square foot	6–6½ months
3.	2·5% DDT	720–840 mgm. per square foot ...	4½–5 months
4.	2·5% DDT	720–840 mgm. per square foot ...	4–4½ months
5.	BHC ...	?	1 month

[It is not clear whether the dose of gamma BHC was 56 or 2·8 mgm. per square foot.]

[Sandflies reappeared immediately in 1–5 days after rooms were re-painted or re-plastered. This suggests that the active cycle of breeding must have continued quite undisturbed, the sandflies seeking alternative resting places.]

G. Macdonald

BOOK REVIEWS

FAUST, Ernest Carroll [A. B., M.A., Ph.D., etc.]. **Human Helminthology. A Manual for Physicians, Sanitarians and Medical Zoologists.** 3rd Edition, thoroughly revised. 744 pp., 313 figs. & 1 pl. 1949. London : Henry Kimpton, 25 Bloomsbury Way, W.C.1. [50*s*.]

1929 was a notable year in the history of medical zoology. Until then information about the parasitic worms found in the human body was chiefly obtainable either from a section in larger works such as COBBOLD's *Entozoa*, LEUCKART's *Die Parasiten des Menschen*, BRAUN's *Tierischen Parasiten des Menschen* (in English edition, *Animal Parasites of Man*) and BRUMPT's *Précis de Parasitologie* or from a textbook appendix as in MANSON's *Tropical Diseases*.

The appearance in that year of Faust's *Human Helminthology* revealed, to many for the first time, that the helminths of man, with their intricate morphology and systematics could provide an absorbing intellectual discipline ranging, through their varied invertebrate and vertebrate intermediate hosts, over almost the whole field of zoology and touching at many points important problems in public health.

As an accomplished investigator and teacher and an insatiable reader of helminthological literature, Faust succeeded in collecting, correlating and assessing an enormous mass of data in so remarkable a manner that his first edition was at once recognized as an outstanding achievement. It has continued to maintain its pre-eminence as an authoritative exposition over other efforts which have followed in the same field. Although much of the original text remains unchanged, this new (third) edition incorporates, without undue enlargement, the many additions and new concepts which have accrued during the ten years which have elapsed since the second edition was prepared. The lists of insect, molluscan and other intermediate hosts have been brought up to date. There are 313 engraved illustrations. The section dealing with the many technical aids to diagnosis includes a description of a new direct-smear egg-counting technique, devised by Professor Beaver, which eliminates the necessity of making corrections for stools of different consistency and gives a direct interpretation in terms of worm burden.

The chapter on Anthelmintics is enlivened by an account of Medieval Anthelmintics. Some of the prescriptions taken from a rare work by Gaebelthauern indicate the strange character of anthelmintic treatment in the 16th century. Even in 1778 the belief prevailed that " a tapeworm is able especially to perceive the decline of the moon and its rejuvenation " for Rosen of Rosenstein observed that " a number of children have presented worms to me with such regularity, that without the almanac, I know from the return of these children the day of the month ".

Turning now from well deserved praise it may perhaps be permitted, to one to whom this encyclopaedic volume is daily an essential working tool, to express some dismay, probably shared by others and especially by teachers familiar with earlier editions, at the restless search for an ideal presentation which has resulted in the displacement of well established sections and chapters from their previous positions and at the author's increasing *penchant* for technical terms, which has now necessitated the provision of an imperfect and somewhat incongruous " Glossary of the Zoological and Medical Terms " used in the text. Happily " Manta " of former editions is now replaced by " Adult ", but acetabulum which the Glossary explains is " commonly called a sucker " and " solenocyte " which similarly " is commonly called flame cell " might also have been discarded. It is not altogether satisfying to be told that " patent ", when applied to the uterine pore means " open or apparent, as indicated by unmistakable signs, like eggs in the faeces or microfilariae in circulating blood ", or that the " prepatent " period is " the biological incubation period ". The reader would probably have welcomed some additional explanations of technical terms, *e.g.*, of " phenotype ".

As in the earlier editions there are useful keys to the commoner helminth eggs and larvae. These are based on the peculiar dichotomous arrangement so beloved by American biologists. In England they are referred to, warningly, as " watch your step " keys. Strangely enough no keys have been supplied to assist in the differential diagnosis of the adult worms. It is doubted if physicians, sanitarians or even the medical zoologists, to whom the manual is specially addressed, have that special training which would enable them to utilize effectively the formal zoological descriptions of the orders, superfamilies, families and genera under which the subject matter is consecutively arranged. Classifications are built up from below, from genus to subfamily, from subfamily to family, and so on, passing from the realm of reality to that of speculation. One does not search for Phasmids before making a diagnosis of *Ascaris* or hookworm or determine the fundamental flame-cell pattern before recognizing a bilharzia worm. The International Code of Zoological Nomenclature, which

is again reproduced *verbatim*, is followed by an informative discussion. The opinions promulgated by the American Society of Parasitologists are also quoted. That on the use of "infection" and "infestation" deserves the attention of British writers on applied helminthology. It runs—"*The terms infect and infection are properly applicable wherever the parasite invades and establishes itself within the body of the host . . . we fail to see any reason for continuing the use of the term infestation as applied to internal parasites.*" The Society also adopted the opinion of its Committee on Nomenclature that "under the International Rules of Zoölogical Nomenclature *Trichuris* rather than *Trichocephalus* is the valid generic name". Faust does not agree with this generally accepted ruling, and his use of *Trichocephalidae* and *Trichocephalus* throughout the text must puzzle the student and embarrass the teacher, until the International Commission clarifies the position.

The volume concludes with a Bibliography of the important literature, which now occupies 40 pages. Quite properly it states that the *Tropical Diseases Bulletin* contains "reviews of all papers in helminthology of interest to students in medicine". *Helminthological Abstracts*, which covers the world's literature, whether or no it be of interest to students of medicine, is not mentioned. The *Journal of Helminthology* is erroneously said to be "mostly devoted to veterinary helminthology". But these are carping criticisms of a comprehensive work of outstanding merit which should find a place in every scientific library and research laboratory. It is by no means an easy introduction to a subject which presents many difficulties. The physician, sanitarian and isolated investigator will find therein many facts of interest and value even though the more technical details are incomprehensible to them.

R. T. Leiper

AUSTRALIA, COMMONWEALTH OF: DEPT. OF EXTERNAL TERRITORIES. **Report of the New Guinea Nutrition Survey Expedition 1947.** Edited by E. H. HIPSLEY & F. W. CLEMENTS. 308 pp., 1 diagram, 1 chart, 2 graphs & 43 pls. [n.d.] Sydney: A. H. Pettifer, Govt. Printer.

This detailed survey of a primitive tropical people was carried out by a team consisting of a doctor, a parasitologist, a nutritionist, two biochemists, an agriculturist, a sociologist, a dental officer and a photographer, members of Australian government departments and universities. Their report covers wider aspects of the health of the natives of New Guinea than the title suggests. Thus the parasitologist found malaria parasites in 28 per cent. of 664 blood samples from unselected subjects. In most of the areas visited malaria was hyperendemic. By contrast no clinical evidence of deficiency diseases was found, except for the presence of endemic goitre in some districts. Clearly malaria was at the time of the survey a far more important medical problem than nutrition.

The staple foods were starchy vegetables such as taro, sweet potato, banana, yam or sago. Little or no animal food was eaten. In consequence the intake of protein was very low. In one group of 24 households, the average daily *per caput* intake of calories was 1,904, but of protein only 24·4 gm. (2·1 of animal origin). This is much lower than acceptable European standards, and there is a suggestion that these natives are partially physiologically adapted to this low protein intake. But no nitrogen balance tests have been carried out and, further, in the absence of any vital statistics and measurements of growth rates, it is difficult to assess precisely the nutritional status of the people and the adequacy of their diet. The dental survey showed a very high incidence of periodontal disease and, although caries was present, its incidence was much lower than "usually observed among most 'civilised' people".

The report would appear in the summary of recommendations to have underestimated the importance of malaria in determining the health and economic prosperity of the natives, and perhaps to have over emphasized the need for protein. Physiological studies on the protein requirements of the inhabitants themselves would be of great interest. The whole report emphasizes the complexity of modern nutritional problems and the wide variety of expert knowledge needed for their solution. Both the organizers of the survey and the members of the team are to be congratulated on this survey, which provides a good basis for future health developments.

R. Passmore

VAN NOORT, Hendrik Roelof. **De betekenis van malaria voor kinderen en de waarde van het miltonderzoek voor de malariabestrijding.** [Influence of Malaria on the Health of School Children, and the Use of Spleen Examination in Malaria Control.] [Thesis for Doctorate of Medicine, Univ. of Amsterdam, Feb. 2, 1950.] 155 pp. [175 refs.] English summary pp. 148–9.

This title would have been more descriptive if " in North Holland " had been added. For although the author has tried to envisage his particular problem as part of a world-wide problem (chapt. I and sect. 1 of chapt. VI), conditions in North Holland differ too much from those in the Tropics and Sub-tropics for comparison between the two to serve a useful purpose. This does not imply, however, that the subject-matter of the book is of local interest only. It concerns all who have to deal with low-grade malaria, causing no death, and comparatively little illness, in the ordinary course of events ; but which, now and again, may cause a good deal of distress which, however (and here one would almost have added " unfortunately "), never can be proved to entail really serious events. The trouble is that money can be obtained for control at the time of the epidemic flare-up, but not at the time when a fresh epidemic is in preparation, and might still be prevented.

Van Noort's book is divided into two parts, which have practically nothing in common. The first part (chapt. II, sect. 3 of chapt. VI) deals with the long-term effect of North Holland malaria on children. The second part (chapt. III–V) considers two points : (*a*) whether a low spleen rate in school children, mainly based on slightly enlarged spleens (often palpable on deep inspiration), can be used in malariometry ; (*b*) whether finding children with slightly enlarged spleens is a help in locating houses in need of spraying.

In the first part the author compares conditions in 1947 of children who had had (1) no malaria, (2) malaria in 1946, (3) frequent attacks of malaria in 1946 (this group is a part of group 2), (4) malaria in 1945, but not in 1946. There was no significant difference in haemoglobin, blood pressure, muscular force, tendency to become physically exhausted, return to normal pulse-frequency after standardized physical exertions, tendency to become mentally exhausted.

In one school mental activity, as estimated by the teachers, showed a significant difference between group (1) on the one hand and groups (2) and (4) on the other. But this finding was not confirmed in five other schools.

A well developed musculature and subcutaneous adipose tissue was slightly more common in group (1) than in (2) and (4) ; in group (3) subcutaneous adipose tissue was less developed than in the remainder of group (2) and in group (4). Pirquet's estimate of the state of nutrition (the so-called " pelidisi " figure) was slightly higher in group (1) than in (2) and (4). The author is in doubt, however, if the unsatisfactory state of nutrition is caused by malaria, or if the disease is more prevalent in under-nourished families.

The number of school days lost by absence in the non-malarious season was markedly higher in groups (2) and (4) than in (1). Here again the author is in doubt as to the interpretation of the result. Over-anxious parents may be

inclined to keep their children at home on the slightest provocation, if these children have been ill with malaria during the season.

Thus, van Noort has to admit that his inconclusive, or completely negative, results may be satisfactory in one respect, but that they are disappointing in another, as they deprive health authorities of a valuable argument in favour of an energetically sustained malaria policy.

The results recorded in the second part warn against attaching too much value to low spleen rates as an indication of the presence of malaria. Spleen rates under 5 per cent. are to be discarded ; a difference between the spleen rates of two localities, or of one locality examined at different times, need not indicate a difference in malarial incidence. There are many children carrying parasites showing no splenic enlargement, not recognizable even on deep inspiration ; inversely, in numerous children with a slight splenomegaly no parasites are found in the peripheral circulation. In low spleen rates and slight splenomegaly diseases whose influence can be readily discounted under tropical conditions play an unduly disturbing part.

The value of spleen examination in children as an aid in the selection of the houses which require spraying is of interest in Holland only, as the need of such a selection is felt in no other country. The author points out, quite correctly, that a child with an enlarged spleen does not signify that it is a parasite carrier. But that is not the point. Houses with malaria patients or parasite carriers are to be sprayed because they are more likely to harbour infected anopheles than others. Now the point is that a child, *a fortiori* more than one child, with an enlarged spleen is an (admittedly not infallible) indication of the presence of a parasite carrier, or an unregistered malaria patient, sharing the house with these children. Thus the enlarged spleen is nothing but a suggestion, which needs verifying. However, if there is shortage of staff, or pressure of time, it is reasonable to make assurance doubly sure by adding the houses with " spleen children " to the list of houses to be sprayed.

This, however, does not detract from the merit of the book, which represents an honest attempt to appraise the long-term effect of pure *vivax* malaria of a low incidence (20 per cent. of the population being about the highest figure recorded) on the children in a population which, at the time the investigations were carried out, had hardly recovered from the after-effects of the German occupation. The conclusion from the author's work must be either that there exists no such an effect, or that it must be measured by methods far beyond the scope of those at his disposal. *N. H. Swellengrebel*

GOARNISSON, J. **La trypanosomiase humaine. Notions élémentaires et pratiques.** [Human Trypanosomiasis. Elementary Principles and Practice.] 2e Edition. Préface du Médecin Général Inspecteur MURAZ. 90 pp., numerous figs. 1947. Paris : Presses Missionnaires, Editions Saint-Paul, 6 rue Cassette. [3*s*. 6*d*.]

This manual of instruction on human trypanosomiasis is the work of a medical missionary in French West Africa and is intended for the use of European health officers and African medical personnel, including those trained at the Dakar medical school. It is therefore concerned solely with the disease as it is caused by *Trypanosoma gambiense*, and any who seek guidance on the course and treatment of *T. rhodesiense* infections will not find it here.

There is a good general account of both trypanosomes, of their West African tsetse vectors, and of diagnosis and treatment. Included in the last two items and extending to more than a quarter of the whole book are details of haematology, microscopy, injection and lumbar puncture technique, and the examination of cerebrospinal fluid, all of which one would not expect to

find taking up such a large part of a small manual specifically devoted to human trypanosomiasis.

Direct transmission is described before clinical transmission (and as much space is given to it) but the abstracter has no knowledge of any epidemic of human trypanosomiasis where the vector was a mosquito and no tsetse flies existed in the region affected. The author states that this can happen.

Courses or treatment for use in both early and late cases are given in tables. First place is given to Atoxyl as the remedy *par excellence* in the early stage when blood and lymphatic system alone have been invaded. Seeing that such a notoriously toxic drug as this is used so widely in French West Africa it is not surprising that Dr. Goarnisson devotes almost a whole chapter to an account of the ocular catastrophes that may occur during treatment with arsenical drugs. His conclusion based on the examination of more than 3,000 patients is that Atoxyl is the cause of the most frequent and devastating eye lesions and that Tryparsamide is the least dangerous of the arsenicals.

In cases where the central nervous system is involved, Tryparsamide is the drug of choice and Germanin (Bayer 205, Antrypol, Suramin, Moranyl) is apparently only used where the infection is resistant to arsenic, but as it is stated to be useless in late cases it is not likely to be efficacious in those cases that have been under observation long enough for arsenic resistance to have been demonstrated.

The commonly used methods of prevention are described. The abstracter does not however think that parasitization of tsetse pupae by *Syntomosphyrum* has ever been of practical value in reducing a tsetse population. Chemoprophylaxis is not mentioned.

The effect of trypanosomiasis on fertility is not always recognized by those who have not worked and lived in communities where the disease is endemic and at times epidemic, and in this book the writer of the preface goes so far as to state that sleeping sickness is the most frequent and hidden cause of infertility in tropical Africa.

The medical staff for whom Dr. Goarnisson writes are well served by this book and those who are responsible for the training of medical personnel in British territories would do well to produce similar manuals.

H. G. Calwell

BERMAN, Charles [M.D., B.Ch. Rand.]. **Primary Carcinoma of the Liver. A Study in Incidence, Clinical Manifestations, Pathology and Aetiology.** With a Foreword by Sir Ernest KENNAWAY, M.D. Oxon., D.Sc. Lond., F.R.S., F.R.C.P. and an Introduction by Henry GLUCKMAN, M.R.C.S. Eng., L.R.C.P. Lond. pp. xvi+164, 83 figs. 1951. London: H. K. Lewis & Co. Ltd. [35*s*.]

The author has published numerous papers on the subject of primary carcinoma of the liver in the Bantu races [see this *Bulletin*, 1951, v. 48, 83] and in this monograph he has given us a complete review of the literature, with his personal observations based on a detailed study of 75 cases. Of 772 recorded cases of cancer in the Bantu workers of the Witwatersrand gold mines between 1925 and 1944, no less than 86·8 per cent. were primary carcinoma of the liver, whereas in Europe the percentage is 1·2 and in the U.S.A. 2·5. The incidence rate was 29 per 100,000 per annum among the Portuguese Bantu, who constituted 35 per cent. of the labour force, against 5 per 100,000 per annum among the remaining 65 per cent. who were South African Bantu. Autopsy statistics show that the liver is the organ of highest cancer frequency in many Far Eastern cities, including Batavia, Singapore and Manila, but the Javanese and immigrant Chinese are affected as frequently as the Bantu labourers. Indonesia, Formosa, South India and Korea are other regions in which high

rates have been reported in biopsy and autopsy specimens. Taking the published statistics for all the Bantu races in Africa, the liver accounted for 50·9 per cent. of all cancers and for 15·3 per cent. of those occurring among the semi-Bantu of West Africa. On the other hand the incidence among American Negroes, though higher than in Europeans, is low compared with that among Africans and Orientals.

Primary liver cancer is predominantly a disease of males, with maximum incidence in the decades 20–30 and 30–40, but it may be met with in early childhood. On the basis of a study of 75 personally observed cases, the author distinguishes 5 clinical types : (1) *frank cancer*, 62·7 per cent. ; (2) *acute abdominal cancer*, 8 per cent. ; the onset is sudden with signs of intra-abdominal haemorrhage ; (3) *febrile cancer*, 8 per cent. ; this is invariably mistaken for tropical liver abscess ; (4) *occult cancer*, 16 per cent., symptomless and discovered on examination or at autopsy ; (5) *metastatic cancer*, 5·3 per cent., in which the symptoms due to metastases—most commonly in the lungs—overshadow those of the primary.

Diagnosis is often difficult, and liver puncture biopsy, by the epigastric route, is recommended as safe and efficient.

Morbid anatomy and histology are dealt with in detail, with many excellent illustrations and photomicrographs. Two types of tumour are recognized ; (1) hepato-cellular, which is the most frequent, consists of solid columns of cells and is considered to arise from the cells of the liver lobules ; (2) cholangio-cellular, in which the cells are arranged in alveoli, is considered to arise from the cells of the intrahepatic bile ducts.

Part IV deals with aetiology, and the close association between cirrhosis and primary liver cancer is shown by a table of reported cases, from which it appears that 67·2 per cent. of 893 autopsies on cases of primary liver cancer showed cirrhosis in addition ; the latter condition is a common autopsy finding in races prone to the former. A discussion of the aetiology of cirrhosis leads to the conclusion that it is probably due to dietary deficiency, particularly protein deprivation. The staple diet of the South African Bantu is maize, with pumpkins, beans, wild fruits or sour milk. Its obvious defects are monotony, vitamin deficiency and shortage of animal proteins ; malnutrition is prevalent, as is shown by the occurrence of pellagra and malignant malnutrition, with which conditions profound liver damage may be associated. Toxic agents such as alcoholism, syphilis, helminth infestation are often found in association with cirrhosis, but none of these is common to all the communities known for their high incidence of primary liver cancer, though a liver already damaged by malnutrition may be more vulnerable to such agents. "It is possible that the distribution of primary liver cancer over a large part of the world depends upon a variable mixture of negative deficiency and positive carcinogenic factors." The successful production of primary liver cancer in experimental animals by various chemical compounds—azo-dyes, 2-acetylamino-fluorene, some carcinogenic hydrocarbons, carbon tetrachlodide and others—affords ample proof that environmental factors are intimately concerned with the origin of these tumours, the development of which can in some cases be influenced by diet. The experimental evidence is briefly reviewed in the last chapters of the book.

As Professor Kennaway says in his Foreword : "The material obtained by Dr. Berman in his investigation of primary cancer of the liver in the Bantu, and the data which he has collected from a very scattered literature, seem to me to constitute one of the most valuable studies of cancer as it occurs in man which has appeared in recent years. . . . Dr. Berman has stated for us a question, the solution of which may throw light upon the whole problem of cancer."

W. L. Harnett

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